This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

NYPL RESEARCH LIBRARIES
3 3433 06633874 4

Anna Palmer Draper

The

Sarah R. Ellison, M.D.,

Collection

NEW YORK No. 579

A
HISTORY
OF
INVENTIONS AND DISCOVERIES.

BY JOHN BECKMANN,

PUBLIC PROFESSOR OF ECONOMY IN THE UNIVERSITY OF GOTTINGEN.

TRANSLATED FROM THE GERMAN,

BY WILLIAM JOHNSTON.

SECOND EDITION.

CAREFULLY CORRECTED, AND ENLARGED BY A FOURTH VOLUME.

IN FOUR VOLUMES.

VOL. II.

LONDON:
PRINTED FOR J. WALKER AND CO.; J. FAULDER; J. BOOKER;
B. AND R. CROSBY AND CO.; R. PRIESTLEY; R. SCHOLEY;
J. RICHARDSON; W. OTRIDGE; J. HARDING; T. HAMILTON;
AND J. BELL.

1814.

EW YORK
IC LIBRARY
504707
ASTOR, LENOX AN
TILDEN FOUNDATIONS
R 1910

Printed by S. Hamilton, Weybridge, Surrey.

CONTENTS

OF

THE SECOND VOLUME.

Page
ARTIFICIAL PEARLS 1
Paving of streets 19
Collections of natural curiosities 41
Chimneys 62
Hungary-water 102
Cork 108
Apothecaries 121
Quarantine 145
Paper-hangings 152
Kermes. Cochineal 163
Writing-pens 195
Wire-drawing 212
Buck-wheat 234
Saddles 247
Stirrups 255
Horse-shoes 270
Floating of wood 293
Lace 309
Ultramarine 315
Cobalt. Zaffer. Smalt 333

Page
Turkeys 350
Butter 372
Index to the authors and books quoted in the Second Volume 393
Index to the most remarkable things mentioned in the Second Volume 403

HISTORY

OF

INVENTIONS.

ARTIFICIAL PEARLS.

THOSE round calcareous* excrescences found both in the bodies and shells of several kinds of shell-fish,* have been used as ornaments since the earliest ages.† Their elegant blueish lustre, occasioned by the enamel with which they are covered, hath raised them to a high value; and this they have always retained on account of their scarcity and the expense arising from the laborious manner in which they are collected. By the increase of luxury among the European nations, the use of pearls has become more common; and even in Pliny's time they were worn by the wives of the inferior public officers, in order that they might vie in the costliness of their dress with ladies of the first rank. It is probable, therefore, that methods were early invented to occasion or hasten the formation of pearls: and as at present those who cannot afford to purchase gold, jewels, and porcelain, use in their stead pinchbeck, artificial gems, and stone-ware; so methods were fallen upon to make artificial pearls.

---

* It was because pearls are calcareous that Cleopatra was able to dissolve hers in vinegar, and by these means to gain a bet from her lover, as we are told by Pliny, l. ix. c. 35, and Macrobius, Saturn. l. ii. c. 13. She must, however, have employed stronger vinegar than that which we use for our tables, as pearls, on account of their hardness and their natural enamel, cannot be easily dissolved by a weak acid. Nature has secured the teeth of animals against the effects of acids, by an enamel covering of the like kind; but if this enamel happen to be injured only in one small place, the teeth soon spoil and rot. Cleopatra perhaps broke and pounded the pearls; and it is probable that she afterwards diluted the vinegar with water, that she might be able to drink it; though dissolved calcareous matter destroys acids and renders them imperceptible to the tongue. We are told that the dissipated Clodius gave to each of his guests a pearl dissolved in vinegar to drink: *ut experiretur in gloria palati*, says Pliny, *quid saperent margaritæ*; *atque ut mire placuere, ne solus hoc sciret, singulos uniones convivis absorbendos dedit*. Horace, lib. ii. sat. 3, says the same. Caligula, also, *mar-*

The art of forcing shell-fish to produce pearls

---

garitas pretiosissimas aceto liquefactas sorbebat. *Suet.* cap. 37. That pearls are soluble in vinegar is remarked in Pausanias, b. viii. ch. 18, and Vitruvius, b. viii. ch. 3.

* That pearls are not peculiar to one kind of shell-fish, as many believe, was known to Pliny, who says, *quo apparet, non uno conchæ genere nasci.* I have a number of very good pearls which were found by my brother in Colchester oysters. It is more worthy of remark, and less known, that real pearls are found under the shield of the sea-hare (*Aplysia*), as has been observed by Bohadsch in his book *De animalibus marinis*, Dresdæ 1761, 4to. p. 39.

† In the time of Job pearls were accounted to be of great value. *Job*, chap. xxviii. ver. 18.

was known, in the first centuries of the Christian æra, to the inhabitants of the coasts of the Red-sea, as we are told by the philosopher Apollonius, who thought that circumstance worthy of particular notice. The Indians dived into the sea, after they had rendered it calm, and perhaps clearer, by pouring oil into it. They then enticed the fish by means of some bait to open their shells; and having pricked them with a sharp-pointed instrument, received the liquor that flowed from them in small holes made in an iron vessel, in which they hardened into real pearls.* Olearius says,

---

* *Philostrat. in Vita Apollon.* lib. iii. cap. 57. edit. Olearii, p. 139. I shall here give the translation of the passage, as amended by Conrade Gesner in his *Hist. nat.* lib. iv. p. 634, because it is more correct than that of Olearius. Dignum existimavi quæ de altero margaritarum genere (arte facto scilicet) traduntur non prætermittere, quandoquidem nec ipsi Apollonio res visa est levis, sed auditu jucunda, et mirabilium omnium mirabilissima. Nam, qua parte insula pelagus respicit, immensa est maris altitudo; fert autem ostreum in testa alba, quadam pinguedine referta. Lapidem autem nullum producit. Inde maris tranquillitatem observant, et aquæ superficiem etiam ipsi olei infusione levigant. Tum ad ostrea capienda ingreditur aliquis, ita instructus paratusque sicut qui spongias colligunt. Est autem ei ferreus later (πλινθις σιδηρᾶ) et alabastrum unguenti; atque ita prope ostrea considens Indus unguento quasi esca ad fallendum utitur. Namque illo perfusa ostrea sese aperientia inebriantur. Tunc ferreo stylo (κεντρῳ) perforata quasi saniem quandam emittunt. Hanc venator ferreo latere (πλινθιδι) excipit, qui in varias multiplicesque formas concavatus est. Ea vero postmodum sanies lapidescit, atque in modum naturalis margaritæ albus ille sanguis obdurescit. Et hæc est quæ ex Rubro Mari colligitur margarita. Huic autem venationis generi etiam Arabes intendunt, ex opposito maris habitantes.—But what is *ferreus later*? Gesner quotes from Gisb. Longolius' edition of Philostratus the fol-

pearl, and strung on a thread, are thrown into each of them. At the end of a year, when the muscles are drawn up and opened, the beads are found covered with a pearly crust, in such a manner that they have a perfect resemblance to real pearls. The truth of this information cannot be doubted, though some experiments made in Bohemia for the same purpose were not attended with success.* It has been confirmed by various persons,† and it is very probable that some operations and secrets, without which the process would prove fruitless even in China, may be unknown to the Europeans. Besides, many observations are known which seem to show the possibility of such an effect being produced. Professor Fabricius says, that he saw in the possession of Sir Joseph Banks, at London, large *chamæ*,‡ brought from China, in which there were several bits of iron wire, incrusted with a substance of a perfect pearly nature.* These bits of wire, he said, had been sharp, and it appeared as if the muscles, to secure themselves against the points of the wire, had covered them with this substance, by which means they had been rendered blunt. May not therefore the process employed by the ancients be still practised? And may not these bits of wire have been the same as those spikes used by the people in the neighbourhood of the Red-sea for pricking muscles, and which perhaps slipped from the hands of the Chinese workmen and remained in the animals?

---

* See Dr. Joh. Mayer's *Bemerkungen*, in the fourth part of *Abhandlungen einer privatgeselschaft in Böhmen*, p. 165.

† Abhandlungen der Schwedischen akadem. der wissenschaften, vol. xxxiv. p. 89. The author of the paper alluded to had a muscle with such artificial pearls, which had been brought from China. It was a *mytilus cygneus*, the swan-muscle, or great horse-muscle. Mention is made also in *Histoire de l'académie des sciences de Paris*, année 1769, of a stone covered with a pearly substance which was found in a muscle.

‡ A kind of muscle-shells, of which there are a great variety. TRANS.

The invention therefore of Linnæus cannot be called altogether new. That great man informed the king and council in the year 1761, that he had discovered an art by which muscles might be made to produce pearls, and he offered to disclose the method for the benefit of the kingdom. This however was not done, but he disposed of his secret to one Bagge, a merchant at Gottenburg, for the sum of eighteen thousand copper dollars, which make about five hundred ducats. In the year 1780, the heirs of this merchant wished to sell to the highest bidder the sealed-up receipt:† but whether the paper was purchased, or who bought it, I do not know; for professor Retzius at Lund, of whom I inquired respecting it, could not inform me.* In the year 1763, it was said in the German newspapers, that Linnæus was ennobled on account of this discovery, and that he bore a pearl in his coat of arms; but both these assertions are false, though professor Fabricius conjectures that the first may be true.† Linnæus received his patent of nobility, which, together with his arms, I have seen, in the year 1756, consequently long before he said any thing respecting that discovery, of which the patent does not make the least mention. What in his arms has been taken for a pearl, is an egg, by which Mr. Tilas, whose business it then was to blazon the arms of ennobled families, meant to represent all nature, after the manner of the ancient Egyptians. The arms are divided into three fields, each of which, by the colour forming the ground, expresses one of the kingdoms of nature; the red signifying the animal, and the green the vegetable, &c. Over the helmet, by way of crest, is placed the *linnea*;‡

---

* J. C. Fabricius Briefe aus London. Dessau 1784, 8vo. p. 104.

† See Schlözer's Briefwechsel, number 40. p. 251.

---

* Dr. Stover, in his Life of Linnæus, vol. i. p. 360, says that the manuscript containing this secret is in the possession of Dr. J. E. Smith at London. TRANS.

† In his Letters, p. 104. The same account is given in *Schreber's Sammlung zu den ökonomischen wissenschaften*, vol. x. p. 353.

‡ This plant, named after the father of botany, grows in Swisserland, Siberia, and Canada, but particularly in Norway and Sweden, in shady places amidst the thick woods. The flowers, which appear in June and July, are shaped like a bell, white without, red in the inside, and somewhat hairy. They have a pleasant smell, especially in the evening. In Tronhiem and the neighbouring parts they are drunk as tea for medicinal purposes. TRANS.

that beautiful little moth the *phalæna linneella*, shining with its silvery colours, is displayed around the border instead of festoons; and below is the following motto, *Famam extendere factis.* Linnæus once showed me, among his collection of shells, a small box filled with pearls, and said, *Hos uniones confeci artificio meo; sunt tantum quinque annorum, et tamen tam magni.* "These "pearls I made by my art, and though so large "they are only five years old." They were deposited near the *mya margaritifera*, from which most of the Swedish pearls are procured; and the son, who was however not acquainted with his father's secret, said the experiments were made only on this kind of muscle, though Linnæus himself assured me that they would succeed on all kinds.

I conjecture that Linnæus alluded to this art in his writings so early as the year 1746, or long before he ever thought of keeping it a secret. The passage I mean is in the sixth edition of his *Systema naturæ*, where he says: *Margarita. Testæ excrescentia latere interiore, dum exterius latus perforatur.** I once told him that I had discovered his secret in his own works; but he seemed to be displeased, did not inquire after the passage, and changed the discourse. That pearls are produced when the shells have been pierced or injured in a certain manner, is highly probable, and has been in modern times often remarked.* It appears also, that the animal has the power of sometimes filling up such openings with a calcareous substance, which it deposits in them. This substance assumes the figure of the orifice, and the animal particles it contains give it its brightness and lustre.† Pearl-fishers have long known that muscles, the shells of which are rough and irregular, or which exhibit marks of violence, commonly contain pearls, though they are found also in others in which the same appearances are not observed.‡ I am perfectly aware that some experiments made by piercing the shells of muscles, have been unsuccessful;§ but this does not prove that it is impossible to procure pearls in that manner. Those who made them did not perhaps pierce the proper part of the shell; perhaps they made the orifice so large that it weakened the animal; and they may not have chosen the properest season of the year. The strongest objection, however, which can be made on this subject, is the undeniable truth that the proper valuable pearls are not found adhering to the shell, but in the body only; and that therefore those calcareous balls which fill up holes, cannot be perfect pearls. But from the words of Linnæus above quoted, I am led to conjecture, that he only made a hole in the shell without piercing it quite through. Linnæus also may have done some injury to the animal itself when it opened its shell; for it is certain that testaceous animals are strong-lived, and can easily sustain any violence. It appears by the Transactions of the Swedish Academy, that some have been of opinion that shell-fish might be made to produce pearls by a particular kind of nourishment; and Lister* thinks that these excrescences would be more abundant, were the muscles placed in water impregnated with calcareous matter; but professor Linnæus seems certain that his father employed none of these methods.

---

* Pearl. An excrescence on the inside of a shell when the outer side has been perforated.

---

* See Chemnitz's theory of the origin of pearls, in the Beschäftigungen der Berlinischen Naturforschenden Geselschaft, i. p. 348.

† The animal part shows itself in distillation by a volatile alkali, and an oil somewhat inflammable. See *Neumanns Chemie*, von Kessel herausgegeben, vol. iii. p. 142.

‡ Abhandlungen der Schwed. Akadem. vol. iv. p. 245, and xxi. p. 142.

§ Fabricius, in his Letters, p. 105, mentions such an experiment, which was however continued only for a year.

Under the name of false or artificial pearls are understood at present small beads so prepared by art as to approach very near to real pearls in shape, lustre, colour, and polish. It appears that in Pliny's time such were not known, else he certainly would have mentioned them. The invention was not easy, and this difficulty to imitate pearls has contributed, with the reasons before mentioned, to keep up their value. It would seem that at first hopes were entertained of finding a method to make large pearls from small or broken ones. Tzetzes speaks of this imagined art,* and receipts for that purpose have been still retained in various books, where they fill up room and amuse the ignorant; for it is hardly possible to give to the pulverised calcareous matter sufficient hardness, and that lustre which belongs only to the surface of real pearls, and which, when these are destroyed, is irrecoverably lost. More ingenious was the idea of making pearl-coloured glass beads of that kind called *margaritini;*† but it excites no wonder that this was not done earlier, though the art of making coloured glass is very old: for opal colours are obtained only by a skilful process and the addition of putty, bone-ashes, and other substances, with which experiments cannot be so easily made upon glass as with iron. Still earlier was the invention of making hollow glass beads, which were incrusted on the inside with a pearl-coloured varnish. This method was first pursued, as far as I have been able to learn, by some artists at Murano; but their invention seems to have been considered by the government as too fraudulent, and was therefore prohibited, as we are told by Francis Massarius, who lived in the beginning of the sixteenth century at Venice, and must therefore have had an opportunity of knowing the truth of this circumstance.* Some say that an amalgam of quicksilver was used for these pearls; and if that was the case, the object of the Venetian prohibition was rather of a medical nature. After this, small balls of wax or gum were covered with a pearl-coloured enamel. These were praised on account of their lustre; but as their beauty was destroyed by moisture, they did not continue long in use.† A French bead-maker, however, named Jaquin, at length found out the manner of preparing the glass pearls used at present, which excell all others, and which approach as near to nature as possible, without being too expensive.

---

* Exercitatio anatomica de cochleis. Londini 1694, p. 183.

---

* Arte autem sic parant: e parvis margaritis comminutis alias majores in orbem effingunt. *Tzetzes,* ut supra.

† This manner of preparing *margaritini* may be seen in my Anleitung zur technologie, p. 307.

Jaquin once observed, at his estate near Passy, that when those small fish called *ables* or *ablettes* were washed, the water was filled with fine silver-coloured particles. He suffered this water therefore to stand for some time, and obtained from it a sediment which had the lustre of the most beautiful pearls; and which on that account led him to the attempt of making pearls from it.* He scraped off the scales of the fish, and called the soft shining powder, which was extended in the water, essence of pearl, or *essence d'orient*.† At first he covered with it small beads made of gypsum, or hardened paste; and, as every thing new, particularly in France, is eagerly sought after, this invention was greatly admired and commended. The ladies, however, for whose use it was chiefly intended, soon found that it did not entirely answer their expectations. They were displeased because this pearly coat, when exposed to heat, separated from the beads, adhered to the skin, and gave it a brightness which they did not wish. They proposed themselves, that small hollow glass beads might be covered, in the inside, in the same manner as mirrors are silvered, with the essence of pearl; and thus was brought to perfection an art of which the following account will enable the reader to form some idea.

---

* Tempore meo Murianenses vitrearii uniones adulterabant. Primum uniones vitreos vacuos, sed translucidos faciebant, deinde materia implebant qua splendidi et unionum coloris redderentur, in tantum ut vix a veris unionibus discerni possent. Quapropter fuerunt decemvirorum decreto vetiti. *Fran. Massarii, Veneti, in nonum Plinii de naturali historia librum castigationes et annotationes.* Basileæ 1537, 4to. cap. 35.

† Alios spes lucri mentita est candidos et nitentes; et si qui alii homines non inexpertos fallent, erunt hi. Ex gummi quodam genere et mistura quadam candida coagulant, formantque, ut minus persentiatur fraus, elenchi plerumque figura. Cum primum tales viderem, astu aliquo dolum tentare non occurrebat. Astute tamen indagari posse existimo, si humidis digitis quantum permissum est contrectentur, ut aliquis gummi lentor, qui fraudem arguat, percipiatur. *Mercati Metallotheca,* p. 211.

---

* These silver-coloured particles were examined by Reaumur, who gave a description of them in *Histoire de l'académie, année* 1716, p. 229. They are found also in the stomach and intestines of those fish.

† By the word oriental it appears that the artist had in his view eastern pearls.

Of a kind of glass easy to be melted, and made sometimes a little blueish or dark, slender tubes are prepared, which are called *girasols.*[*] From these the artist blows, by means of a lamp, as many small hollow globules as he may have occasion for. One workman can in a day blow six thousand; but when they are required to be extremely beautiful, only twelve or fifteen hundred; and that they may have a greater resemblance to nature, he gives them sometimes blemishes, like those generally observed in real pearls. They are made of all figures; some shaped like a pear, others like an olive, and some that may be considered as *coques de perles.*[†] To overlay these thin glass bubbles he mixes the pearl essence with melted isinglass; and the more of the former he uses, the pearls become the more beautiful and more valuable. This varnish, when heated, he blows into each globule with a fine glass pipe, and spreads it over the whole internal surface, by shaking the pearls thus prepared in a vessel placed over the table where he is at work, and which he puts in motion by his foot, until the varnish is equally diffused all over the inside of them, and becomes dry. Sometimes he adds to the essence some red, yellow, or blue colour; but as this is a deviation from nature, it is not accounted a beauty. To give these tender globules more solidity and strength, they are filled with white wax. They are then bored through with a needle, and threaded in strings for sale. The holes in the finer sort, however, are first lined with thin paper, that the thread may not adhere to the wax.[*]

---

[*] *Girasol.* This word, which is wanting in most dictionaries, signifies opal, and sometimes that stone called cat's-eye, *silex catophthalmus, pseudopalus,* &c. *Couleur de girasol* is applied to semi-transparent milk-white porcelain.

[†] *Coques de perles* are flat on one side, and are used for ornaments, one side of which only is seen. By Pliny they are called *physemata.* Artificial pearls of this kind have, for some time past, been employed in making ear-rings. Our toymen, after the French, give these pearls the name of *perles coques*; but the following account of Pouget in *Traité des pierres precieuses et de la manière de les employer en parure,* Paris 1762, 2 vol. quarto, i. p. 20, makes me dubious respecting them. "*La coque de perle,*" says he, "is not formed in a pearl-shell like the pearl; it is procured from a kind of snail found only in the East-Indies. There are several species of them. The shell of this animal is sawn in two, and one *coque* only can be obtained from each. The *coques* are very small, and one is obliged to fill them with tears of mastic to give them a body, before they can be employed. This beautiful snail is found generally in the sea, and sometimes on the shore." May not Pouget here mean that kind of snail which others call *burgeau,* the shells of which are,

---

in commerce, known by the French under the name of *burgaudines?*—Should that be the case, the animal meant would be the *nautilus pompylius*, as may be concluded from *Histoire des Antilles*, par Du Tertre, Paris 1667, 3 vol. quarto, ii. p. 239. For the author says, *C'est de leur coque que les ouvriers en nacre tirent cette belle nacre qu'ils appellent la burgandine, plus estimée que la nacre de perle.* Irregular pearls are called *baroques*, or Scotch pearls, because abundance of such were once found at Perth in Scotland. See *Physical. ökon. biblioth.* iii. p. 244. Some years ago artificial pearls of an unnatural size, called Scotch pearls, were for a little time in fashion.

[*] A complete account of the art of making glass pearls is contained in a book, which I have however not seen, entitled, *L'Art*

The name *able*, or *ablette*, is given to several species of fish; but that which produces the pearl-essence is the *cyprinus alburnus*, called in English the bleak. Professor Hermann, at Strasburg, was so kind as to send me one of these fish, which was caught there for the purpose of making pearl-essence, and which was dried so carefully that the species could with certainty be distinguished. It corresponded exactly with the figure given in Duhamel,* which has almost a perfect resemblance to that given by Schoneveld.† May not the *alburnus* mentioned by Ausonius ‡ among the inhabitants of the Moselle, be the same? At any rate, the bleak is to be found only in fresh water; and on account of its voracity bites readily at the hook. It is caught for the use of the French manufacturers in the Seine, the Loire, the Saone, the Rhine,§ and several other rivers. To obtain a pound

---

d'imiter les perles fines, par M. Varenne de Beost, correspondant de l'Académie Royale. An extract from it may be found in *Dictionnaire des arts et metiers, par M. Joubert,* iii. p. 370. See also the articles *perle* and *able* in the *Encyclopédie,* i. p. 29; xii. p. 382.

* Traité générale des pesches, par. ii, suite de la troisieme section, p. 403. tab. 23, fig. 1 et 2.

† Ichthyologia, auctore St. a Schonevelde. Hamburgi 1624. 4to. p. 12, tab. 1, fig. 2, albula.

‡ Quis non et virides volgi solatia tincas
Norit, et alburnos prædam puerilibus hamis?
Auson. Mosel. ver. 126.

§ In the *Almanach de Strasburg* for 1780, p. 76, among the commodities sold there were, Des ecailles d'ablettes dont on tire l'essence d'orient employée pour les fausses perles.

of scales above 4000 fish are necessary; and these do not produce four ounces of pearl essence; so that from eighteen to twenty thousand are requisite to have a pound of it. In the Chalonnois, the fishermen get for a pound of washed scales fifteen, eighteen, and twenty-five livres. The fish, which are four inches in length, and which have not a very good taste, are sold at a cheap rate, after their scales have been scraped off. At St. John de Maizel, or Mezel, in the Chalonnois, there is a manufactory in which 10,000 pearls are made daily.*

The first makers of these pearls must have laboured under a very great inconvenience, as they were acquainted with no method of preserving the fishy particles for any time. They were obliged to use the essence immediately, because it soon putrefied, and contracted an intolerable stench. The great consumption, however, required that the scales should be brought from distant provinces. Attempts were made to preserve them in spirit of wine or brandy; but the acid of these liquors corroded the particles, destroyed their lustre, and left them only a dull white colour. In the like manner brandy spoiled a real pearl, which, with the animal and the shell (*mactra lutraria*), was sent to me by Dr. Taube, at Zell. It was, therefore, a very important discovery for this art that these animal particles can be kept for a long time in volatile alkali, which is now alone used, and which perhaps could be used for many other purposes of the like kind.*

---

* Description historique et topographique du duché de Bourgogne, par M. Courtépée, tom. iv. A Dijon 1779. 8vo. p. 534.

That the inventor of these pearls was called Jaquin, and that he was a bead-maker at Paris, all agree; but the time of the invention seems to be uncertain. Some say that it belongs to the reign of Henry IV;† and Reaumur mentions the year 1656. These pearls, however, in the year 1686, when Jaquin had an assistant named Breton, must not have been very common; for we are told in the *Mercure galant* of that year, that a marquis possessed of very little property, who was enamoured of a lady, gained her affections and carried his point by presenting her with a string of them, which cost only three louis; and which she, considering them as real ones, valued at 2000 francs. The servant who put the marquis on this stratagem, declared that these pearls withstood heat and the moisture occasioned by perspiration; that they were not easily scratched, had almost the same weight as real ones, and that the person who sold them warranted their durability in writing. Jewellers and pawnbrokers have, therefore, been often deceived by them. Jaquin's heirs still continue this business, and have a considerable manufactory *au Rue de petit lion* at Paris; but the great quantity of glass pearls worn at present have not, perhaps, all come from France. It is not improbable that some may be made in the Netherlands and Germany; for the fish are not scarce in either of these countries, and the art is now well known.[*]

---

* See Sage's Chemische untersuchung einiger mineralien, p. 82.

† Traité des pierres précieuses et de la maniere de les employer en parure. Par Pouget. Paris 1762. 4to. i. p. 19.

PAVING OF STREETS.

The most beneficial regulations of police, which we have inherited from our ancestors, are, at present, considered to be so indispensable or necessary, that many people imagine they must at all times have existed. If one, however, takes the trouble to inquire into the antiquity of these regulations, it will be found that the greater part of them are new, and that they were unknown to the largest and most magnificent cities of ancient times. Among these are posts,[†] the night-watch, hackney coaches, and, besides many others, the paving of streets.

---

[*] We are informed, in *Acta societatis Upsaliensis*, 1741, 4to. p. 75, that these fish are caught in Holland, where they are called *alphenaer* and *koning van asterling*.

[†] I reckon the post among police regulations, to which its object originally belonged, as well as that of the coining of money; though in the course of time it has been made a productive source of revenue, by which it has been rendered burdensome to the public, while its utility has been lessened.

Several cities, indeed, had paved streets before the beginning of the Christian æra; but those which are at present the ornament of Europe, Rome excepted, were all destitute of this great advantage, till almost the twelfth or thirteenth century. I must nevertheless acknowledge, that in the Greek and Roman authors I have hitherto met with more proofs of paved highways than of paved streets. But we have reason to believe that the richest nations paid attention to the streets before their doors, sooner than to the roads before their gates. In all probability, the former were paved at different times, and by private persons; and required so little expense and so few regulations, that no occasion was given to remark the time when it was done. On the other hand, for the constructing of highways many miles in length, the concurrence of States, and the consent and assistance of all the inhabitants, were necessary; and, on that account, such circumstances were inserted in annals, and they were sometimes copied afterwards by historians, and mentioned in their works. In the East, where the roads are not spoiled, as among us, by snow, ice, and rain, and where many cities were built on eminences and in dry situations, the paving of streets and highways may have been later thought of than might be expected, when we consider the refinement of the ancient people who inhabited that country, and the progress they had made in the arts. Such undertakings also were often retarded by the want of stones; an obstacle which many nations overcame with an ingenuity and patience at which we, among whom workmen are fewer, and the price of labour higher, because we have more wants, and enjoy more liberty, are not a little astonished. It is however to be conjectured, that those people who first carried on the greatest trade were the first who paid attention to have good streets and highways, in order to facilitate intercourse, so necessary to keep up the spirit of commerce.

This conjecture is in some measure confirmed by the testimony of Isidorus,* who says that the Carthaginians had the first paved streets, and that their example was soon copied by the Romans. Long before that period, however, Semiramis paved highways, as we are told by the vain-glorious inscription which she herself caused to be put up.† Of the paving of the Grecian cities I know nothing further than that at Thebes the streets were under the inspection of the telearchs, who had the care of keeping them in repair, and of cleaning them. This office, which was there held in contempt, the spiteful inhabitants conferred upon Epaminondas, in order to disgrace him; but, by his prudence and attention to the public good, he rendered it so respectable, that it was afterwards sought for as an honourable employment. The streets of Thebes, therefore, were paved, else how would it have been possible to clean them?* Whether Jerusalem was paved I do not know; for, in the first book of Kings mention is made only of the fore-court of the temple.† Josephus‡ relates that the Jews proposed to Agrippa, after the building of the temple was finished, to employ the workmen who had been discharged, the number of whom, with Jewish exaggeration, he makes amount to eighteen thousand, in paving the streets;

---

* Strata dicta, quasi vulgi pedibus trita. Lucretius: Strataque jam vulgi pedibus detrita viarum. Ipsa est et delapidata, id est lapidibus strata. Primum autem Pœni dicuntur lapidibus vias stravisse; postea Romani eas per omnem pene orbem disposuerunt, propter rectitudinem itinerum, et ne plebs esset otiosa. *Origin.* lib. xv. cap. 16.

† Strabo, lib. xvi. p. 1071. Diodor. Sic. lib. ii. cap. 13. Polyæni Stratagem. lib. viii. cap. 26, where we find the inscription as follows: Πετρας αβατους σιδηρῳ κατειργασαμην. Ὀδους ετεμον εμοις οχημασιν. Invias petras ferro domui. Vias meis vehiculis secui quas ne feræ

---

quidem prius ambulaverant. The last sentence may mean also, that she had travelled these roads with her carriages, which left deep ruts behind them.

* Epaminondas, cum ei cives irati sternendarum in oppido viarum contumeliæ caussa curam mandarent (erat enim illud ministerium apud eos sordidissimum), sine ulla cunctatione id recepit, daturumque se operam ut brevi speciosissimum fieret asseveravit. Mirifica deinde procuratione abjectissimum negotium pro amplissimo ornamento expetendum Thebis reddidit. *Valerius Max.* lib. iii. cap. 7. The same account is given, but more fully, by Plutarch, in *Reipublicæ gerendæ præcepta*, p. 811.

† 1 Kings, chap. vii. ver. 12.

‡ Antiquit. lib. xx. cap. 9.

but this however was not done. We read in the Talmud,* that the streets of Jerusalem were swept every day, which undoubtedly implies a hard and solid pavement.

That neither the streets of Rome nor the roads around it were paved during the time of its kings, is well known.† In the year 188 after the abolition of the monarchical form of government, Appius Claudius, who was then censor, constructed the first real highway, which was as properly called after him the Appian way, as it was named on account of its excellence the queen of roads.‡ The time however when the streets began to be paved, cannot with certainty be determined; for the passage of Livy,§ from which some have endeavoured to prove that it was in the year 578 after the building of the city, is inconclusive, as it will admit of various explanations equally probable. It may be read, without forcing the sense, as if Livy said that the pavement of the streets was then covered with sand for the first time; that the streets were then first paved at the public expense, or that the paving of them was then performed for the first time by contract. Besides, we are told by Livy himself,[*] that the censors in the year of the city 584 caused the streets to be paved from the oxen-market (forum Boarium) to the temple of Venus, and around the seats of the magistrates in the great circus: but the information of the same historian that the ædiles in the year 459 caused the streets to be paved from the temple of Mars to the Bovile, and from the Capena gate to the temple of Mars,[†] does not apply here, as some have imagined; for the temple of Mars was without the city, and the author speaks not of streets but of highways. The extravagant Heliogabalus caused the streets around the palace, or on the Palatine mount, to be paved with foreign marble.[‡] The inspection of the streets belonged to the ædiles; and, under certain circumstances, occasionally to the censors. In the course of time, however, particular officers, *curatores viarum*, called on account of their number *quatuor viri viarum*, were appointed for that express purpose. Thus we are told that the two brothers, Publii Malleoli, when curule ædiles, caused the *Mons Publicius* to be paved, so that carriages could pass from the street Velia to Mount Aventine.* That streets paved with lava, having deep ruts made by the wheels of carriages, and raised banks on each side for the accommodation of foot-passengers, were found both at Herculaneum and Pompeii, is well known from the information of various travellers.†

---

* Pesachim, fol. 71. Metzia, fol. 26. See J. E. Fabers Archæologie der Hebräer. Halle 1773, 8vo. p. 340.

† Histoire des grands chemins de l'empire Romain, par Nic. Bergier. Paris 1622, 4to. liv. i. chap. viii. p. 21.

‡ Appia longarum teritur regina viarum. *Statius, Sylv.* ii. 2. v. 12.

§ Censores vias sternendas silice in urbe, glarea extra urbem substruendas marginandasque primi omnium locaverunt. *Livius,* lib. xli. cap. 27.

---

[*] Viam e foro Boario ad Veneris, et circa foros publicos, et ædem Matris Magnæ in Palatio faciendam locaverunt. Lib. xxix. cap. 37.

[†] Semitamque saxo quadrato a Capena porta ad Martis straverunt. Lib. x. cap. 23. Equally inapplicable are the passages lib. xxxviii. cap. 28, and lib. x. cap. 47.

[‡] Stravit et saxis Lacedæmoniis ac porphyreticis plateas in Palatio, quas Antoninianas vocavit; quæ saxa usque ad nostram memoriam manserunt, sed nuper eruta et execta sunt. *Æl. Lamprid. Vita Heliogab.* cap. 24. This passage has been illustrated neither by Casaubon nor Saumaise.

Of modern cities, the oldest pavement is commonly ascribed to that of Paris; but it is certain that Cordova in Spain was paved so early as the middle of the ninth century, or about the year 850, by Abdorrahman II, the fourth Spanish caliph. This prince, who knew the value of the arts and sciences, and who favoured trade so much that abundance in his reign prevailed throughout the whole land,‡ caused water to be conveyed into that city, which was then his capital, by leaden pipes, and ornamented it with a mosque and other elegant buildings.[*]

---

* Parte locant clivum, qui tunc erat ardua rupes
Utile nunc iter est; Publiciumque vocant.
Ovid. Fastor. lib. v. ver. 293.

See also Marc. Varro, lib. iv. de L. L. Festus p. 310. An examination of the question whether the ædiles or censors had the inspection of the streets may be found in Ducker's notes on Liv. lib. x. cap. 32.

† G. H. Martini, Das gleichsam auflebende Pompeii. Leipsig 1779, 8vo. p. 122. H. M. A. Cramers Nachrichten zur geschichte der Herculanischen entdeckungen. Halle 1773, 8vo. p. 50.

‡ Cardonne Geschichte von Africa und Spanien unter den Arabern, übersetzt von C. G. von Murr. Nurnberg 1768, 8vo. i. p. 187.

The capital of France was not paved in the twelfth century; for Rigord, the physician and historian of Philip II, relates, that the king standing one day at a window of his palace near the Seine, and observing that the carriages which passed threw up the dirt in such a manner that it produced a most offensive stench, his majesty resolved to remedy this intolerable nuisance by causing the streets to be paved; which was accordingly done, notwithstanding the heavy expense that had prevented his predecessors from introducing the same improvement. The orders for this purpose were issued by the government in the year 1184; and upon that occasion, as is said, the name of the city, which was then called Lutetia on account of its dirtiness, was changed to that of Paris.[†] This service rendered to Paris by that sovereign, who first also caused the cathedral to be surrounded by a wall, is confirmed by various historians.[*] Mezeray informs us, that Gerard de Poissy, then intendant of the finances, expended eleven thousand marks of silver in this undertaking. It appears that a certain income was allowed to the city for defraying the expenses; for in 1285, a hundred years after, when it was proposed that the pavement should be carried with-

---

[*] Anno Arabum ducentesimo trigesimo sexto, regni autem sui trigesimo, præcepit plateas Cordubæ pavimento lapideo solidari, et aquam a montanis, plumbeis fistulis derivari, et fontes juxta mezquitam, et juxta præsidium et in aliis locis eductione nobili emanare. *Roderici Ximenez, archiepiscopi Toletani, Historia Arabum*, cap. xxvi. p. 23. This history of Roder. Ximenes may be found at the end of Erpenius' *Historia Saracenica*, published in Arabic and Latin at Leyden in 1625.

[†] Factum est autem post aliquot dies, quod Philippus rex semper Augustus Parisiis aliquantulum moram faciens, dum sollicitus pro negotiis regni agendis in aulam regiam deambularet, veniens ad palatii fenestras, unde fluvium Sequanæ pro recreatione animi quandoque inspicere consueverat rhedæ equis trahentibus, per civitatem

transeuntes, fœtores intolerabiles lutum revolvendo procreaverunt. Quod rex in aula deambulans ferre non sustinens, arduum opus, sed valde necessarium, excogitavit, quod omnes prædecessores sui ex nimia gravitate et operis impensa aggredi non præsumpserant. Convocatis autem burgensibus cum præposito ipsius civitatis, regia auctoritate præcepit, quod omnes vici et viæ totius civitatis Parisii duris et fortibus lapidibus sternerentur. Ad hoc enim christianissimus rex conabatur, quod nomen antiquum auferret civitati; lutea enim a luti fœtore prius dicta fuerat. Sed gentiles, quondam, hujusmodi nomen propter fœtorem abhorrentes, a Paride Alexandro filio Priami regis Trojæ Parisios vocaverunt. *Rigordus de gestis Phil. Augusti* in *Hist. Script. Franc.* Parisiis 1649. fol. p. 16. Published by Duchesne.

[*] Circa eadem tempora Philippus magnanimus, pia et regali indignatione super intolerantiam luti vicorum Parisiacæ civitatis motus, fecit omnes vicos quadratis lapidibus pavimentari. *Gullielmi Armorici Historia de vita et gestis Philippi Augusti,* in the above-quoted collection of Duchesne, p. 73.

Circa eadem tempora (1185) Philippus magnanimus, pia et regali indignatione super intolerantia luti vicorum Parisiacæ civitatis motus, fecit omnes vicos ejus quadratis lapidibus pavimentari, et tunc recte primo civitas amisit proprietatem antiqui vocabuli quo Lutetia vocabatur, ad cujus exemplum aliæ civitates et castella, vicos et plateas; pontes et introitus et exitus universos et stratas publicas straverunt lapidibus durissimis et quadratis. *Alberici monachi Trium Fontium Chronicon*, editum a G. G. Leibnitio, Lipsiæ 1698, 4to. p. 367.

out the gate of St. Martin, the citizens excused themselves from the work, by saying that the funds assigned to them were not sufficient for that purpose.[*] It is certain, that in the year 1641 the streets in many quarters of Paris were not paved.[†]

It is very probable that other opulent cities, finding the benefit which the capital derived from this improvement, were induced to follow its example. At any rate we know that Dijon, which was then reckoned one of the most beautiful, had paved streets so early as the year 1391, to which Philip the Bold, duke of Burgundy, the second husband of Margaret heiress of Flanders and other parts of the Netherlands, contributed two thousand livres; and in 1424 paviors were employed on all the streets.[‡] Historians remark, that after this period dangerous diseases, such as the dysentery, spotted fever, and others, became less frequent in that city.

That the streets of London were not paved at the end of the eleventh century, is asserted by all historians. As a proof of this, they relate that in the year 1090, when the church of St. Mary-le-Bow, in Cheapside, was unroofed by a violent storm of wind, four pillars or beams, which were twenty-six feet in length, sunk so deep into the ground, that scarcely four feet of them appeared above the surface. The streets of London then, says Howel, were not paved, but consisted of soft earth.* I can, however, find no account of the time when paving was first introduced. It appears that the pavement of this immense city became gradually extended as trade and opulence increased. Several of the principal streets, such as Holborn, which at present are in the middle of the city, were paved for the first time by royal command in the year 1417.† Others were paved under Henry VIII,‡ some in the suburbs in 1544,§ others in 1571 and 1605,‖ and the great market of Smithfield, where cattle are sold, was first paved in 1614.*

---

[*] In the royal patent of 1285, which may be found in *Histoire de la Ville de Paris*, par Felibien, i. p. 104, are the following words: Nec sufficerent redditus concessi dictis burgensibus, præ pavando in quatuor cheminis principalibus, ad pavandum in locis prædictis.

[†] A proof of this may be seen in *De la Mare*, iv. p. 197, who gives the best account respecting the regulations made to keep in repair the pavement of the streets of Paris. The later regulations are given by Perrot in *Dictionnaire de voierie*, Paris 1782, 4to. p. 315.

[‡] Description historique et topographique du duché de Bourgogne, par M. Courtépée, tom. i. p. 233, & tom. ii. p. 62.

---

* Anderson's History of Commerce, vol. i. p. 483.

† In the king's order it was said, that the highway named Holbourn in London (alta via regia in Holbourne Londoniæ) was so deep and miry, that many perils and hazards were thereby occasioned as well to the king's carriages passing that way as to those of his subjects; he therefore ordained two vessels, each of twenty tons burthen, to be employed at his expense, for bringing stones for paving and mending the same. *Anderson's Hist. of Com.* i. p. 244.

‡ In this order the streets were described "as very foul, and full of pits and sloughs, very perilous, and (noyous) noisome, as well for the king's subjects on horseback as on foot, and with carriage." *Anderson,* ut supra p. 370.

§ Anderson, p. 373. ‖ Anderson, p. 469.

Of German cities I can mention only Augsburg, which by its trade soon rose to such eminence as to be able to rival magnificent Rome, of which it was a colony, in many expensive improvements. This city from the earliest periods had small subterranean passages under the streets for conveying away filth, which in some measure resembled the Roman *cloacæ*. Hans Gwerlich, a rich merchant there, having caused a neat foot-path to be made before his house, in the oxen-market, in 1415, gave rise to the paving of the city; for this convenience was so much admired, that after that time all the streets were paved successively at the expense of the government.† Berlin, in the first half of the 17th century, was not entirely paved. The new market was first paved in 1679, and the following years, and King-street before the houses in 1684. The square behind the cathedral and before the present tilt-yard remained without pavement in 1679.‡

When a solid bottom had been given to streets, the cleansing of them, which, as the Roman prætors said, is a continual improvement,§ was then rendered possible. At Rome were appointed *tribuni rerum nitentium*, who had the care of cleaning the streets, markets, temples, baths, and other public places.[*] Strict orders were given that no filth should be thrown into the river or streets; whoever transgressed against this prohibition was subjected to punishment, and obliged to repair the damage.[†] The public sewers, *cloacæ*, under the streets contributed very much to facilitate the cleaning of them, yet they were commonly full of mud,[‡] as those of Paris are at present, notwithstanding the many expensive regulations established to prevent that nuisance.

---

* Anderson, i. p. 491. See also A new History of London by J. Noorthouck; London, 1773, 4to. p. 121. 217. 414. 436.

† Von Stetten Kunstgeschichte der stadt Augsburg, p. 87.

‡ Nicolai, Beschreibung der stadt Berlin, i. p. 26.

§ Sed et purgare refectionis portio est. *Digest.* lib. xliii. tit. 2.

Some centuries after Paris was paved, every citizen was obliged to repair the street before his house, and to clean it at his own expense, as is expressly commanded in an order issued by Philip the Bold,[§] in the year 1285. The public, however, are often careless and negligent respecting the most beneficial regulations, when the maintaining of them is attended with trouble and expense be it ever so small. By this want of attention, all the streets of Paris were in the fourteenth century entirely spoiled and filled with dirt; but they were again repaired; and in 1348 a law was first made for inflicting punishment upon those who neglected to clean them.* This law was rendered more severe in 1388, and several times afterwards. The novelty of it, the dread of punishment, and the vigilance of the new inspectors, produced such an effect that the inhabitants of one or more neighbouring streets joined together and kept at their common expense a dirt-cart, which at that time was called *un tombereau*; but the nobility and the clergy, who always wish for immunities, endeavoured to exempt themselves from this burthen. The markets and public squares remained therefore uncleaned, and became still dirtier, as those who resided in the neighbourhood began to throw filth into them privately in the night-time, in order to avoid the expense of having it carried away, till at length these places were rendered so impassable, that the toymen who frequented them with their wares wished to abandon them. For this reason it was enacted in the year 1399, that no one should be exempted from cleaning the streets; and an order was issued in 1374, that all those who lived in the markets, together with the toymen who had booths there, should clean them at their joint expenses.† Many now made the removing of dirt a trade, and entered into contracts for that purpose; but they as well as the paviors turned so extravagant in their demands, that a price was set upon the labour of the former in 1396, and the latter in 1501 were united into a company, every member of which was obliged to subscribe to certain regulations.*

---

[*] Notitia utraque dignitatum, et in eam Pancirolli commentarium. Lugduni 1608. Notit. imperii occident. cap. 19. This work may be found in Grævii Thes. Antiq. Rom. vol. vii.

[†] Digestorum lib. xliii. tit. 12. and lib. ix. tit. 3, de his qui effuderint vel dejecerint.

[‡] Et prætor medio cogitur ire luto. *Martial.* Epig. vii. 61. This line in some editions is in epig. 60. See also Juvenal, sat. iii. ver. 247.

[§] A full history of the regulations made respecting the cleaning of the streets of Paris may be found in *Continuation du traité de la police*, p. 200.

---

* De la Mare, iv. p. 202.

† De la Mare, iv. p. 172. 203.

When the city at length increased in size and population, the cleaning of the streets became too troublesome and expensive to be left any longer to the care of individuals. Besides, those who inhabited the suburbs complained, and with great justice, that the burthen lay so heavy upon them as to be intolerable; because all the carts which entered the city, or which conveyed filth from it, rendered their streets much dirtier than the rest. It was resolved therefore, in the year 1609, that the streets should be cleaned at the public expense, under the inspection of the police; and a certain revenue in wine was set apart for that purpose. The first person with whom a contract was entered into for this service, was allowed yearly, for cleaning the whole city, 70,000 livres, which sum was raised in 1628 to 80,000.† In 1704, the Parisians were obliged to collect 300,000 livres, for which Government undertook to maintain the lamps and clean the streets; but in 1722 this contribution was increased to 450,000. The last contract with which I am acquainted is that of the year 1748, by which the undertakers were to be allowed yearly, during six years, for removing the dirt 200,000 livres, and for clearing away the snow and ice in winter 6000 more, making in all the sum of 206,000 livres.*

---

* De la Mare, p. 205.

† De la Mare, iv. p. 243. 239. 216.

All these regulations and expenses, however, would undoubtedly have been attended with very little benefit, had not deliberate dirtying of the streets been strictly prohibited, and all opportunities of doing so been as much as possible prevented. As the young king Philip, whom his father Louis the Fat had united with himself as co-regent, and caused to be crowned at Rheims, was passing St. Gervais on horseback, a sow running against his horse's legs made him stumble, and the prince being thrown was so much hurt, that he died next morning, October the third 1131. On account of this accident an order was issued, that no swine in future should be suffered to run about in the streets; but this was opposed by the abbey of St. Anthony, because, as the monks represented, it was contrary to the respect due to their patron to prevent his swine from enjoying the liberty of going where they thought proper. It was found necessary therefore to grant these clergy an exclusive privilege, and to allow their swine, if they had bells fastened to their necks, to wallow in the dirt of the streets without molestation.*

---

* This contract is inserted in *Dictionnaire de voierie,* par Perrot, p. 305. In 1445 six carts were employed at Dijon in cleaning the streets, as mentioned in the first volume of the before-quoted *Description du duché de Bourgogne,* p. 234.

A very improper liberty prevailed at Paris in the fourteenth century, which was, that all persons might throw any thing from their windows whenever they chose, provided they gave notice three times before, by crying out *Gare l'eau*, which is as much as to say, Take care of water. This privilege was forbidden in 1372, and still more severely in 1395.† A like practice however seems to have continued longer at Edinburgh; for in the year 1750, when people went out into the streets at night, it was necessary, in order to avoid disagreeable accidents from the windows, that they should take with them a guide, who as he went along called out, with a loud voice, in the Scotch dialect, *Had your haunde*, Stop your hand.‡

This practice however would not have been suppressed at Paris, had not the police paid particular attention to promote the interior cleanliness of the houses, and the erection of privies. Some will perhaps be astonished that these conveniencies should have been first introduced into the capital of France by an order from government in the sixteenth century; especially as they are at present considered to be so indispensably necessary, that few summer-houses are constructed without them. Those, however, to whom this affords matter of surprise must be still more astonished, when they are told that the residence of the king of Spain was destitute of this improvement, at the very time that the English circumnavigators found privies constructed in the European manner near the habitations of the cannibals of New Zealand.* But Madrid is not the royal residence which has had dirty streets longest on account of this want. Privies began to be erected at Warsaw for the first time only within these few years.†

---

* Histoire de la ville de Paris, par Sauval, vol. ii. p. 640. Saint-foix, Versuche in der geschichte der stadt Paris, Kopenhagen 1757, 8vo. i. p. 147.

† De la Mare, iv. p. 253. Perrot, in Diction. de Voierie, p. 307.

‡ Letters from Scotland, 1760, 2 vol. 8vo.

---

* An account of the voyage in the Southern Hemisphere, by Hawkesworth, 1773, 4to, vol. ii. p. 281.

† Whoever wishes to enter deeper into the history of this family convenience, certainly an object of police, the improvement of which the Academy of Sciences at Paris did not think below its notice, may consult the following work: *Mémoires de l'Academie des sciences, inscriptions, belles lettres, beaux arts, &c. nouvellement établie à Troyes en Champagne.* A Troyes et Paris 1756, two small volumes 12mo. The author, who by this piece of ridicule wished, perhaps, to avenge himself of some academy which did not admit him as a member, has collected from the Greek and Latin writers abundance of dirty passages respecting this question: *Si l'usage de chier en plein air étoit universel chez les anciens peuples.*

In the Parisian code of laws, *Coûtume de Paris*, which was improved and confirmed in 1513, it is expressly ordered, that every house should have a privy.* This order, with the denunciation of severer punishment in case of disobedience, was renewed in 1533; and in 1538 the under officers of police were obliged to examine the houses, and to report the names of those who had not complied with this beneficial regulation. It appears, however, that the order of 1533 was not the latest; for in 1697, and even in 1700, the police was under the necessity of strictly commanding "that people should construct privies in their "houses, and repair those already constructed, "and that within a month at furthest, under the "penalty of being fined in case of neglect, and of "having their houses shut up until they should "be in a proper condition." This order is given in the same words in the Coûtume de Mante, Etampes, Nivernois, Bourbonnois, Calais, Tournay, and Melun.† That issued at Bourdeaux is of the year 1585.‡

He proves from a passage of Aristophanes, *Ecclesiaz*. ver. 1050, that the Greeks had privies in their houses.

* De la Mare, i. p. 568, and iv. p. 254. Tous propriétaires de maisons de la ville et fauxbourgs de Paris sont tenus avoir latrines et *privez* suffisans en leurs maisons.

† De la Mare, ut supra. Coûtume de Mante, art. 107. Etampes, art. 87. Nivernois, chap. x. art. 15. Bourbonnois, art. 515. Calais, art. 179. Tournay, tit. 17. art. 5. Melun, art. 209.

‡ Anciens et nouveaux statuts de la ville et cité de Bourdeaux. A Bourdeaux 1612, 4to. p. 134.

All these regulations of police were not much older in Germany than in Paris. The cleaning of the streets was considered there as an almost dishonourable employment, which in some places was assigned to the Jews, and in others to the executioner's servants. The Jews were obliged to clean the streets of Hamburgh before the present regulations were established.* How old these may be I do not know, but in the year 1585 there were dirt carts in that city, and a tax was paid by the inhabitants for supporting them. At Spandau, in 1573, the skinners were obliged to sweep the market-place, which was not then paved, and for this service they were paid by the council.† In the beginning of the 17th century the streets of Berlin were never swept, and the swine belonging to the citizens wallowed in the increasing dirt the whole day, as well as in the kennels, which were choked up with mud. In the year 1624, when the elector desired the council to order the streets to be cleaned, they replied, that it would then be of no use, as the citizens at that time were busy with their farms. Near Peter's church there was a heap of dust so large that it almost prevented people from passing, and it was with great difficulty, and not until strict orders had been often repeated, that the elector could get the inhabitants to remove it. For a long time dirt of every kind was emptied in the new market-place, and lay there in such quantity, that an order was issued in 1671, that every countryman who came to the market should carry back with him a load of dirt. The director of the public mill made continual complaints, that, by the dirt being shot down near the long bridge, the mill-dam was prevented from flowing. Hog-sties were erected in the streets, sometimes even under the windows. This practice was forbidden by the council in 1641;* but it was nevertheless continued until the elector at length, in the year 1681, gave orders that the inhabitants should not feed swine; and this prohibition was carried into effect without any exception, as St. Anthony had no abbeys at Berlin. Privies, however, seem to have been common in the large and flourishing towns of Germany much earlier than in the capital of France; and those who are not disposed to find fault with me for introducing proofs here which historians have not disdained to record, may read what follows:[*] In the annals of Franckfort on the Mayne, where mention is made of the cheapness of former times, we are told how much a citizen there gave in the year 1477 for cleaning his privy.[†] We are informed also, that in 1496 an order was issued by the council forbidding the proprietors of houses situated in a certain place planted with trees to erect privies towards the side where the trees were growing;[‡] and that in 1498 George Pfeffer von Hell, J. U. D. and chancellor of the electorate of Mentz, fell by accident into a privy, and there perished.[‖] It appears however from the streets and houses of most of our cities, that they were constructed before such conveniencies were thought of, and that these were erected through force at a later period.

---

* Von Griesheims Anmerkungen über den tractat: Die stadt Hamburg. Hamburg 1759, 8vo. p. 90.

† Historische Beyträge die Preussischen und benachbarten staaten betreffend. Berlin 1784, 4to. iii. p. 373.

---

* Nicholai Beschreibung von Berlin, p. 26. The author quotes, from the order published at Berlin, Nov. 30, 1641, respecting the buildings of the city, section fourth, the following words; "Many citizens have presumed to erect hog-sties in the open streets, and often under the windows of bed-chambers, which the council cannot by any means suffer;" and in the seventeenth section hog-sties are forbidden to be erected in future in the small streets near the milk-market.

---

[*] Frivola hæc fortassis cuipiam et nimis levia esse videantur, sed curiositas nihil recusat. *Vopiscus in Vita Aureliani*, cap 10.

[†] Chronica der stadt Frankf. von. C. A. von Lersner, i. p. 512.

[‡] Ibid. ii. p. 23.

[‖] Ibid. ii. p. 210.

COLLECTIONS OF NATURAL CURIOSITIES.

If it be true that the written accounts which those who had recovered from sickness caused to be drawn out of their cure, their disorder, and the medicines employed to remove it, and to be hung up in the temples, particularly that of Æsculapius, were the first collections of medical observations,[*] as seems to appear by the testimony of Hippocrates, who did not disdain to make use of them in order to acquire information;[†] we have every reason to conjecture, that the rare animals, plants, and minerals, generally preserved in the temples also, were the first collections of natural curiosities, and that they may have contributed as much to promote the knowledge of natural history, as those tablets to improve the art of medicine. Natural objects of uncommon size or beauty, and other rare productions, on which nature seemed to have exerted her utmost power, were in the earliest periods consecrated to the gods.[‡] They were conveyed to the temples, where their value became still enhanced by the sacredness and antiquity of the place; where they continued more and more to excite respect and awaken curiosity, and where they were preserved as memorials to the latest generations, with the same reverence as the other furniture of these buildings.* In the course of time these natural curiosities dedicated to the gods became so numerous, that they formed collections which may be called large for those periods, and for the infant state in which natural history then was..

---

[*] Fragments of such inscriptions have been collected by Mercurialis in his work *De arte gymnastica*, lib. i. cap. 1, from which they have been copied by Barchusen into his *Historia Medicinæ*, Amstel. 1710, 8vo. p. 7.

[†] Plin. lib. xxix. cap. 1. Strabo, lib. xiv.

[‡] Etiam nunc Deo præcellentem arborem, dicant. *Plin.* lib. xii. cap. 2.

When Hanno returned from his distant voyages, he brought with him to Carthage two skins of the hairy women whom he found on the Gorgades islands, and deposited them as a memorial in the temple of Juno, where they continued till the destruction of the city.† The horns of a Scythian animal, in which the Stygian water that destroyed every other vessel could be contained, were sent by Alexander as a curiosity to the temple of Delphi, where they were suspended, with an inscription, which has been preserved by Ælian.‡ The monstrous horns of the wild bulls which had occasioned so much devastation in Macedonia, were by order of king Philip hung up in the temple of Hercules.[*] The unnaturally formed shoulder-bones of Pelops were deposited in the temple of Elis.[†] The horns of the so called Indian ants were shown in the temple of Hercules at Erythræ;[‡] and the crocodile found in attempting to discover the sources of the Nile was preserved in the temple of Isis at Cæsarea.[§] A large piece of the root of the cinnamon-tree was kept in a golden vessel in one of the temples at Rome, where it was examined by Pliny.[‖] The skin of that monster which the Roman army in Africa attacked and destroyed, and which probably was a crocodile, an animal common in that country, but never seen by the Romans before the Punic war, was by Regulus sent to Rome, and hung up in one of the temples, where it remained till the time of the Numantine war.[¶] In the temple of Juno, in the island of Melita, there were a pair of elephant's teeth of extraordinary size, which were carried away by Masinissa's admiral, and transmitted to that prince, who, though he set a high value upon them, sent them back again because he heard they had been taken from a temple.[*] The head of a basilisc was exhibited in one of the temples of Diana;[†] and the bones of that sea monster, probably a whale, to which Andromeda was exposed, were perserved at Joppa, and afterwards brought to Rome.[‡] In the time of Pausanias, the head of the celebrated Calydonian boar was shown in one of the temples of Greece; but it was then destitute of bristles, and had suffered considerably by the hand of time. The monstrous tusks of this animal were brought to Rome, after the defeat of Anthony, by the emperor Augustus, who caused them to be suspended in the temple of Bacchus.[§] Apollonius tells us, that he saw in India some of

---

* Pliny says in his preface: Multa valde pretiosa ideo videntur, quia sunt templis dicata.

† Plin. lib. vi. cap. 31.

‡ Ælian. Hist. Animalium, lib. x. cap. 40.

---

[*] We are so informed by two Greek epigrams.

[†] Plin. lib. xxviii. cap. 4.

[‡] Plin. lib. xi. cap. 31.

[§] Plin. lib. v. cap. 9. This crocodile was still remaining in the author's time.

[‖] Plin. lib. xii. cap. 19.

[¶] Plin. lib. viii. cap. 12. Valer. Max. lib. i. cap. 8. Orosius, lib. iv. cap. 8. Corium autem ejus Romam devectum (quod fuisse centum viginti pedum spatio ferunt) aliquamdiu cunctis miraculo fuit. *Jul. Obsequens de prodigiis*, cap. 29. Hujus serpentis max-

---

illæ usque ad Numantinum bellum in publico pependisse dicuntur. May not this animal have been the *Boa constrictor?*

[*] Cicero in Verrem, iv. cap. 46. Valer. Max. lib. i.

[†] Scaliger de Subtilit. lib. xv. exercit. 246.

[‡] Plin. lib ix. cap. 5, and lib. v. 13. 31. Strabo, lib. xvi: Ανδρομεδαν εκτεθηναι τῳ κητει.

[§] Pausanias, in Arcadicis, cap. 46 & 47. Αναθηματα δε εν τῳ ναῳ τα αξιολογωτατα, εστι μεν το δερμα ὑος του Καλυδωνιου· διεσηπετο δε ὑπο του χρονου και ες απαν ην τριχων ηδε ψιλον. In templo memoratu dignissima dona sunt: apri Calydonii corium, putre jam præ vetustate, et setis undique nudatum.

those nuts which in Greece were preserved in the templesas curiosities.[*]

It is certain, however, that all these articles, though preserved in the temples of the ancients as rarities or memorials of remarkable events, or as objects calculated to silence unbelief, were not properly kept there for the purpose to which our collections of natural curiosities are applied; but at the same time it must be allowed that they might be of as much utility to naturalists, as the tablets, in which patients who had recovered thanked the gods for their cures, were to physicians.

We are told by Suetonius, that the emperor Augustus had in his palace a collection of natural curiosities.[†] I, however, do not remember that any of the ancient naturalists make mention of their own private collections; though it is well known that Alexander gave orders to all huntsmen, bird-catchers, fishermen, and others, to send to Aristotle whatever animals they could procure;* and although Pliny was accustomed to make observations on such as he had an opportunity of seeing. No doubt can be entertained that a collection of natural curiosities was formed by Apuleius, who, next to Aristotle and his scholar Theophrastus, certainly examined natural objects with the greatest ardour and judgment; who caused animals of every kind, and particularly fish, to be brought to him either dead or alive, in order to describe their external and internal parts, their number and situation, and to determine their characterizing marks, and establish their real names; who undertook distant journeys to become acquainted with the secrets of nature; and who on the Getulian mountains collected petrifactions, which he considered as the effects of Deucalion's flood.† It is much to be lamented that the zoological works of this learned and ingenious man have been lost.

---

[*] Philostrat. in Vita Apollon. lib. iii. cap. 5. *Ενταυθα και τα καρυα φυεσθαι φασιν, ων πολλα προς ἱεροις ανακειται τοις δευρο, ϑαυματος ενεκα.* His quoque, ut ipsi aiunt, nuces crescunt, cujusmodi multæ apud nos in templis asservantur, ut admirationi sint.—I conjecture that these nuts were cocoa-nuts.

[†] Sua prætoria non tam statuarum tabularumque pictarum ornatu quam rebus vetustate ac raritate notabilibus excoluit, qualia sunt Capreis immanium belluarum ferarumque membra prægrandia, quæ dicuntur Gigantum ossa. *Suetonius, Vita Augusti,* c. 72.

---

* Plin. lib. viii. cap. 16.

† The following extracts are taken from his defence when accused of sorcery: Profiteor me quærere, non piscatoribus modo, verum etiam amicis meis negocio dato, quicunque minus cogniti generis piscis inciderit, ut ejus mihi aut formam commemorent, aut ipsum vivum, si id nequierint, vel mortuum ostendant. - - - Dico, me de particulis omnium animalium, de situ earum, deque numero, deque causa conscribere, ac libros ανατομων Aristotelis et explorare studeo et augere - - - Quæ alii de genitu animalium, deque particulis, deque omni differentia reliquerunt - - - - - ea Græce et Latine adnitar conscribere, et in omnibus aut omissa anquirere, aut defecta supplere. *The object of his inquiries was,* nosse quanta sit etiam in istis providentiæ ratio, non de diis immortalibus matri et patri credere. *This predecessor of Linnæus lived according to every appearance in the time of Antoninus.*

The principal cause why collections of natural curiosities were scarce in ancient times, must have been the ignorance of naturalists in regard to the proper means of preserving such bodies as soon spoil or corrupt. Some methods were indeed known and practised, but they were all defective and inferior to that by spirit of wine, which prevents putrefaction, and which by its perfect transparency permits objects covered by it to be at all times viewed and examined. These methods were the same as those employed to preserve provisions, or the bodies of great men deceased. They were put into salt brine or honey, or were covered over with wax.

It appears that in the earliest periods bodies were preserved from corruption by means of salt,* and that this practice was long continued. We are told that Pharnaces caused the body of his father Mithridates to be deposited in salt brine, in order that he might transmit it to Pompey.† Eunapius, who lived in the fifth century, relates that the monks preserved the heads of the martyrs by means of salt;[*] and we are informed by Sigebert, who died in 1113, that a like process was pursued with the body of St. Guibert, that it might be kept during a journey in summer.[†] In the same manner the priests preserved the sow which afforded a happy omen to Æneas, by having brought forth a litter of thirty pigs, as we are told by Varro, in whose time the animal was still shown at Lavinium.[‡] A hippocentaur (probably a monstrous birth), caught in Arabia, was brought alive to Egypt; and as it died there, it was, after being preserved in salt brine, sent to Rome to the emperor, and deposited in his collection, where it was shown in the time of Pliny, and in that of Phlegon.[§] Another hippocentaur was preserved

---

* Salis natura, corpora adstringens, siccans, alligans; defuncta etiam a putrescendo vindicans, ut durent ita per sæcula. *Plin.* lib. xxxi. cap. 9. The same thing is repeated by Isidorus in his *Origin.* lib. xvi. cap. 2. Nitre also was employed for the like purpose. *Plin.* lib. xxxi. cap. 10. *Herodot.* lib. ii. *Sextus Empiricus* in *Pyrrhon. hypotypos.* cap. 24. The last author ascribes this custom to the Persians in particular.

† Dion Cassius, lib. xxxvii. cap. 14. Φαρνακης δε το τε σωμα αυτου τῳ Πομπηιῳ, ταριχευσας, ελεγχον του πεπραγμενου, επεμψε. Pharnaces conditum

---

muria corpus Mithridatis ad Pompeium misit, tanquam rei gestæ argumentum. See the Life of Pompey in Plutarch, who adds that the countenance of Mithridates could no longer be distinguished, because the persons who embalmed the body in this manner had forgotten to take out the brain: τον γαρ εγκεφαλον ελαθεν εκτηξαι τους θεραπευοντας.

[*] Eunapius in Ædesio.

[†] Sigebertus in Acta sancti Guiberti, cap. 6.

[‡] Hujus suis ac porcorum etiam nunc vestigia apparent Lavinii, quod et simulacra eorum ahenea etiam nunc in publico posita, et corpus matris ab sacerdotibus, quod in salsura fuerit, demonstratur. *Varro de re rustica,* lib. ii. cap. 4.

[§] Phlegon Trallian. de mirabil. cap. 34, 35, adopts in his account the same expression as that used in the *Geoponica,* lib. xix.

by the like method, and transmitted to the emperor Constantine at Antioch;* and a large ape of the species called Pan, sent by the Indians to the emperor Constantius, happening to die on the road by being shut up in a cage, was placed in salt, and in that manner conveyed to Constantinople.† This method of preserving natural objects has been even employed in modern times to prevent large bodies from being affected by corruption. The hippopotamus described by Columna was sent to him from Egypt preserved in salt.‡

To put dead bodies in honey, for the purpose of securing them from putrefaction, is an ancient practice,§ and was used at an early period by the

---

cap. 9, respecting the preservation of the flesh. Pliny however says, lib. vii. cap. 3, Nos principatu Claudii Cæsaris allatum illi ex Ægypto hippocentaurum in melle vidimus.—Perhaps it was placed in honey after its arrival at Rome, in order that it might be better preserved.

[*] Jerome, in the Life of Paul the Hermit, after describing a hippocentaur, says, Hoc ne cuiquam ob incredulitatem scrupulum moveat, sub rege Constantino, universo mundo teste defenditur. Nam Alexandriam istiusmodi homo vivus perductus, magnum populo spectaculum præbuit; et postea cadaver exanime, ne calore æstatis dissiparetur, sale infuso Antiochiam, ut ab imperatore videretur, allatum est.

[†] Philostorgii Historia ecclesiastica, edit. Gothofredi, Genevæ 1643, 4to. p. 41.

[‡] Columnæ Aquatil. et terrestr. observat. cap. 15. Raius, Synops. quadrup. p. 123.

[§] Mellis natura est, ut putrescere corpora non sinat. *Plin.* lib. xxii. cap. 24.

Assyrians.[*] The body of Agesipolis king of Sparta, who died in Macedonia, was sent home in honey,[†] as were also the bodies of Agesilaus[‡] and Aristobulus.[§] The faithless Cleomenes caused the head of Archonides to be put in honey, and had it always placed near him when he was deliberating upon any affair of great importance, in order to fulfil the oath he had made to undertake nothing without consulting his head.[||] According to the account of some authors, the body of Alexander the Great was deposited in honey,[¶] though others relate that it was embalmed according to the manner of the Egyptians.* The body of the emperor Justin II was also placed in honey mixed with spices.† The wish of Democritus to be buried in honey ‡ is likewise a confirmation of this practice. Honey was often applied in ancient times to purposes for which we use sugar. It was employed for preserving fruit;§ and this process is not disused at present.‖ In order to preserve fresh for many years the celebrated purple dye of the ancients, honey was poured over it,¶ and certain worms useful in medicine were kept free from corruption by the like means.[*] By the same method also were natural curiosities preserved, such as the hippocentaur already mentioned; and it has been employed in later times, as is proved by the account given by Alexander ab Alexandro,[†] respecting the supposed mermen.

---

[*] Strabo, lib. xvi. Θαπτουσι δ' εν μελιτι κηρῳ περιπλασαντες. Sepeliunt in melle, cera cadavere oblito.

[†] Εκεινος μεν εν μελιτι τιθεις. In melle positus domum relatus est, regiaque illi contigit sepultura. *Xenophon, Rerum Græc.* lib. v. p. 384. edit. Basiliæ 1555. fol.

[‡] Diodorus Siculus, lib. xv.

[§] Josephi Antiq. Judaic. lib. xiv. cap. 13. De Bello Jud. lib. i. cap. 7.

[||] Cleomenes Lacon, assumpto uno ex familiaribus suis, Archonide, eum consortem et adjutorem sui propositi fecit. Juravit igitur ei, si voti compos fieret, se omnia cum ipsius eapite transacturum esse. Quum vero potitus rerum esset, occiso socio, caput ejus resectum vasi pleno mellis imposuit: et quotiescunque aliquid agere instituisset, ad id inclinatus propositum narrabat; dicens, se pactum non violare, neque jusjurandum fallere: etenim consilium se cum Archonidis capite capere. *Æliani Var. hist.* lib. xii. cap. 8.

[¶] Duc et ad Hemathios manes, ubi belliger urbis
Conditor Hyblæo perfusus nectare durat.
STATIUS, Silv. iii. 2.

---

* Curtius, lib. x. cap. 10.

† Thura Sabæa cremant, fragrantia mella locatis
Infundunt pateris, et odoro balsama succo,
Centum aliæ species unguentaque mira teruntur,
Tempus in æternum sacrum servantia corpus.
CORIPPUS de laudibus Justini II.

‡ Quare Heraclides Ponticus plus sapit, qui præcepit ut comburerent, quam Democritus, qui ut in melle servarent; quem si vulgus sequutus esset, peream, si centum denariis calicem mulsi emere possemus. *Varro, in Nonius*, cap. iii. The following words of Lucretius, b. iii. ver. 902, *aut in melle situm suffocari*, allude perhaps to the above circumstance.

§ Columella, xii. 45: Tunc quam optimo et liquidissimo melle vas usque ad summum ita repleatur, ut pomum submersum sit— Apicii Ars coquinar. lib. i. cap. 20.

‖ Krunitz, Œkonom. encyclop. v. p. 489, and xxv. p. 30.

¶ Plutarch in the Life of Alexander relates, that among other valuables in the treasury at Susa, that conqueror found 5000 talents of the purple dye, which was perfectly fresh, though nearly two hundred years old, and that its preservation was ascribed to its being covered with honey. This account is well illustrated in *Mercurialis Var. lect.* lib. vi. cap. 26.

Among the Scythians,[‡] Assyrians,[§] and Persians,[‖] dead bodies were covered over with wax. That of Agesilaus, because honey could not be procured, was preserved in this manner,[¶] which

---

[*] Multa et alia ex his remedia sunt, propter quæ in melle servantur. *Plin.* lib. xxix. cap. 4.

[†] Alexandri ab Alexan. Dier. genial. lib. iii. cap. 8.

[‡] Herodot. lib. iv. cap. 71. τον νεκρον κατακεκηρωμενον μεν το σωμα.

[§] Θαπτουσι δ᾽ εν μελιτι, κηρῳ περιπλασαντες. Sepeliunt in melle, cera cadavere oblito. The bodies therefore were first covered with wax, and then deposited in honey.

[‖] Herodot. lib. i. cap. 140. Κατακηρωσαντες δη ων τον νεκυν Περσαι, γῃ κρυπτουσι. Persæ mortuum cera circumlinentes in terram condunt. Cicero, at the end of the first book of his Tusculan Questions, says: Persæ etiam cera circumlitos mortuos condiunt, ut quam maxime permaneant diuturna corpora. *Alexandri ab Alexan. Dier. genial.* lib. iii. cap. 8.

[¶] Ibi eum amici, quo Spartam facilius perferre possent, quod mel non habebant, cera circumfuderunt, atque ita domum retulerunt. *Cornel. Nep. Vita Agesilai,* cap. 8. Οἱ παροντες Σπαρτιαται κηρον επιτηξαντες τῳ νεκρῳ, μελιτος ου παροντος, απηγον εις Λακεδαιμονα. Comites Agesilai Spartiatæ mellis penuria cadaver ejus cera conditum Lacedæmonem reportarunt. *Plutarchus in Vita Agesilai.*

The following passage of Quintilian's *Institut. Orat.* lib. vi. cap. 1. 40. is understood by most commentators, as if the author meant to say that a waxen image of the person deceased, made by indeed ought not to be despised even at present. When the Orientals are desirous of transporting fish to any distance, they cover them over with wax;* and the apples carried every year to the northern parts of Siberia and Archangel, from the southern districts of Russia, are first dipped in melted wax, which, by forming a thick coat around them, keeps out the air, and prevents them from spoiling. This property has in my opinion given rise to the ancient custom of wrapping up in wax-cloth the dead bodies of persons of distinction. Linen, or perhaps silk, which had been done over with wax, was used on such occasions, but not what we at present distinguish by the name of wax-cloth, which is only covered with an oil-varnish in imitation of the real kind. The body of St. Ansbert, we are told, was wrapped up *linteo cerato;* and a *camisale ceratum*† was drawn over the clothes which covered that of St. Udalric. When Philip duke of Burgundy died in 1404, his

---

pouring the wax into a mould of gypsum, was exhibited. "Et prolata novissime, deformitate ipsa (nam ceris cadaver attulerant infusum) præteritam quoque orationis gratiam perdidit." See *Turnebi Adversar.* lib. xxix. cap. 13. But in my opinion it appears very probable that the body itself, covered with wax, was carried into the court.

[*] Near Damietta are found a kind of mullets, which, after being covered over with wax, are by these means sent throughout all Turkey, and to different parts of Europe. *Pocock's Travels.*

[†] Theophilus Raynaudus de incorruptione cadaverum, in the thirteenth volume of the works of that Jesuit, printed at Lyons in 1665, fol. p. 40.

body was wrapped up in thirty-two ells *de toile cirée.*[*] In an ancient record, respecting the ceremonial to be used in burying the kings of England, it is ordered that the body shall be wrapped up in wax-cloth.[†] In the year 1774, when the grave of king Edward I., who died in 1307, was opened, the body was found so closely wrapped up in wax-cloth, that one could perfectly distinguish the form of the hand, and the features of the countenance.[‡] The body of Johanna, mother of Edward the Black Prince, who died in 1359, was also wrapped up in *cerecloth;* and in like manner the body of Elizabeth Tudor, the second daughter of Henry VII, was *cered by the wax-chandler.*[§] After the death of George II, the apothecary was allowed one hundred and fifty-two pounds for fine double wax-cloth, and other articles necessary to embalm the body.[||] The books

---

[*] Description du duché de Bourgogne, par Beguillet, vol. i. p. 192.

[†] Liber regalis, *in the article* de exequiis regalibus: Corpus in panno lineo cerato involvitur; ita tamen quod facies et barba illius tantum pateant. Et circa manus et digitos ipsius, dictus pannus ceratus ita erit dispositus, ut quilibet digitus, cum pollice utriusque manus, singillatim insuatur per se; ac si manus ejus chirothecis lineis essent coopertæ.

[‡] Archæologia, or Miscellaneous tracts relating to antiquity, vol. iii. p. 376.

[§] Dart's Antiquities of Westminster, vol. ii. p. 28.

[||] In the account of the funeral expenses stands the following article: To Thomas Graham, apothecary to his majesty, for a fine double cerecloth, with a large quantity of very rich perfumed arofound in the grave of Numa, as we learn from the Roman historians, though they had been buried more than five hundred years, were, when taken up, so entire, that they looked as if perfectly new, because they had been closely surrounded with wax-candles. Wax-cloth it is probable was not then known at Rome.*

In those centuries usually called the middle ages, I find no traces of collections of this nature, except in the treasuries of emperors, kings, and princes, where, besides articles of great value, curiosities of art, antiquities and relics, one sometimes found scarce and singular foreign animals, which were dried and preserved. Such objects were to be seen in the old treasury at Vienna; and

---

matic powders, &c. for embalming his late majesty's royal body, 152*l*. See *Archæologia* ut supra, p. 402.

* Livius, lib. xl. cap. 29. In altera arca duo fasces, candelis involuti, septenos habuere libros, non integros modo, sed recentissima specie. Pliny, b. xiii. chap. 13, relates the same thing with a little variation respecting the annals of Cassius Hemina: Mirabantur alii, quomodo illi libri durare potuissent. Ille ita rationem reddebat: lapidem fuisse quadratum circiter in media arca vinctum candelis quoquoversus. In eo lapide insuper libros impositos fuisse, propterea arbitrari eos non computruisse. Et libros citratos fuisse, propterea arbitrarier tineas non tetigisse.—Hardouin thinks that *libri citrati* were books in which *folia citri* were placed to preserve them from insects. The first editions however have *libri cedrati*, and even the paper itself may have been covered over with some resinous substance. The scarce edition which I received as a present from professor Bause at Moscow: *Opus impressum per Joan. Rubeum et Bernardinum Fratresque Vercellenses* 1507, fol. has in page 98 the word *caedratos*, and in the margin *caeratos*.

in that of St. Denis was exhibited the claw of a griffin, sent by the king of Persia to Charlemagne; the teeth of the hippopotamus, and other things of the like kind.* In these collections the number of the rarities always increased in proportion as a taste for natural history became more prevalent, and as the extension of commerce afforded better opportunities for procuring the productions of remote countries. Menageries were established to add to the magnificence of courts, and the stuffed skins of rare animals were hung up as memorials of their having existed. Public libraries also were made receptacles for such natural curiosities as were from time to time presented to them; and as in universities the faculty of medicine had a hall appropriated for the dissection of human bodies, curiosities from the animal kingdom were collected there also by degrees; and it is probable that the professors of anatomy first made attempts to preserve different parts of animals in spirit of wine, as they were obliged to keep them by them for the use of their pupils; and because in old times dead bodies were not given up to them as at present, and were more difficult to be obtained.

At a later period collections of natural curiosities began to be formed by private persons. The object of them at first appears to have been rather to gratify the sight than to improve the understanding; and they contained more rarities of art, valuable pieces of workmanship and antiquities, than productions of nature.[*] It is certain that such collections were first made in places where many families had been enriched without much labour by trade and manufactures, and who, it is likely, might wish to procure to themselves consequence and respect by expending money in this manner. It is not improbable that such collections were formed, though not first, as Mr. Stetten thinks,[†] at a very early period at Augsburg, and this taste was soon spread into other opulent cities and states.

---

* A catalogue of this collection may be found in the second volume of Valentin's *Museum museorum*.

Private collections, however, appear for the first time in the sixteenth century; and there is no doubt that they were formed by every learned man who at that period applied to the study of natural history. Among these were Hen. Cor. Agrippa of Nettesheim;[‡] Nic. Monardes, Paracelsus, Val. Cordus,[§] Hier. Cardan, Matthiolus 1577,

---

[*] Von Stettens Kunstgeschichte von Augsburg, p. 218.

[†] Ut supra, p. 362.

[‡] Of H. C. Agrippa a good account may be found in the *Colnischen Wochenblatte* 1788, p. 121.

[§] With how much care this learned man, who died in 1544 in the twenty-ninth year of his age, collected minerals and plants is proved by his *Silva observationum variarum, quas inter peregrinandum brevissime notavit*. Walch, in his *Naturgeschichte der versteinerungen*, considers it as the first general oryctography of Germany, and is surprised that so extensive a work should have been thought

Conrade Gesner, George Agricola 1555;[*] Pet. Bellon 1564; W. Rondelet 1566; Thurneisser;[†] Abraham Ortelius 1598;[‡] and many others. That such collections were formed also in Eng-

---

of at that period. Wallerius, in his *Lucubratio de systematibus mineralogicis*, Holmiæ 1768, 8vo. p. 27, considers this *Silva* as a systematic description of all minerals. Both however are mistaken. Cordus undertook a journey in 1542, through some parts of Germany, and drew up a short catalogue without order, of the natural objects he met with in the course of his travels, which was published by Conrade Gesner, together with the other works of this industrious man, at Strasburgh in 1561. This book, which I have in my possession, has in the title page: *In hoc volumine continetur Valerii Cordi in Dioscoridis libros de medica materia*; *ejusdem historiæ stirpium*, &c. The *Silva* begins page 217.

[*] That Agricola had a good collection, may be concluded from his writings, in which he describes minerals according to their external appearance, and mentions the places where they are found. He says likewise himself in the preface to his book *de natura fossilium*, page 168: Sed cum nostræ venæ non gignant omnis generis res fossiles, eas quæ nobis desunt non modo a Germaniæ regionibus quæ iis abundant, verum ab omnibus ferme Europæ, a quibusdam Asiæ et Africæ, apportandas curavi. In quibus negociis conficiendis mihi et docti homines et mercatores et metallici operam navarunt. The learned men who assisted him are named in the preface to *Rerum metallicarum interpretatio*, page 469. Both these works are printed in the folio collection published at Basle in 1546.

[†] H. Mohsen says in his *Beytragen sur geschichte der wissenschaften in Mark Brandenburg*, Berlin 1783, 4to. p. 142, Thurneisser is the first person, as far as is known at present, who in this country formed a collection of natural curiosities.

[‡] Ortelius habebat domi suæ imagines, statuas, nummos, --- conchas ab ipsis Indis et Antipodibus, marmora omnis coloris, spiras testudineas tantæ magnitudinis, ut decem ex iis viri in orbem sedentes cibum sumere possent; alias rursum ita angustas, ut vix magnitudinem capitelli unius aciculi adæquarent. *M. Adami Vitæ Germanorum philosophorum*. Haidelbergæ 1615, 8vo. p. 431.

land during the above century, is proved by the catalogue which Hakluyt used for his works.[*]

The oldest catalogues of private collections which I remember, are the following: Samuel Quickelberg, a physician from Antwerp, who about the year 1553 resided at Ingolstadt, and was much esteemed by the duke of Bavaria, published in quarto at Munich in 1565: *Inscriptiones vel tituli theatri amplissimi, complectentis rerum universitatis singulas materias et imagines.* This pamphlet contained only the plan of a large work, in which he intended to give a description of all the rarities of nature and art. I have never had an opportunity of seeing it. I am acquainted only with a copious extract from it, which induces me to doubt whether Walch was right in giving it out as a catalogue of the author's collection.[†]

The same year, 1565, John Kentmann, a learned physician of Torgau, sent a catalogue of his collection, which consisted principally of minerals and shells, to Conrade Gesner, who caused it to be printed.* The order observed in it is principally borrowed from Agricola. This collection, however, was not extensive. It was contained in a cabinet composed of thirteen drawers, each divided lengthwise into two partitions, and the number of the articles, among which, besides minerals, there were various productions found in mines and marine bodies, amounted to about sixteen hundred. It must however have been considerable for that period, as the collector tells us he laid out sums in forming it which few could be able to expend ;† and as Jacob Fabricius, in order to see it, undertook a journey from Chemnitz to Torgau.‡ About this time lived in France that ingenious and intelligent potter, Bernard Palissy, who collected all kinds of natural and artificial rarities, and published a catalogue of them, which he made his guide in the study of natural history.§ Michael Mercati, a physician, who was cotemporary, formed also in Italy a large collection of natural curiosities, and wrote a very copious description of them, which was first printed about the beginning of the last century.* The collection of Ferdinand Imperati, a Neapolitan, the description of which was printed for the first time in 1599, belongs to the same period;† and likewise the large collection of Fran. Calceolari of Verona, the catalogue of which was first printed in 1584.‡ Walch and some others mention the catalogue of Brackenhoffer's collection as one of the earliest, but it was printed for the first time only in 1677.§

---

[*] See Biographia Britannica, vol. iv. p. 2469.

[†] This extract may be seen in *D. G. Molleri Dissert. de technophysiotameis*, Altorfi 1704, p. 18. Some account of Quickelberg may be found in *Sweertii Athenæ Belgicæ*, Antverpiæ 1628, fol. p. 671; in Val. Andreæ Bibliotheca Belgica, Lovanii 1643, 4to. p. 806; and in Simleri Bibliotheca instituta a Gesnero, Tiguri, 1574, fol. p. 617. Moller writes the name Guiccheberg, and Walch in the place above quoted, p. 24, Quicheberg; but the first-mentioned authors call him Quicckelberg or Quiccelberg.

---

* De omni rerum fossilium genere libri aliquot, opera Conradi Gesneri. Tiguri 1565, 8vo.

† He says in the preface: Thesaurum fossilium multis impensis collegi, paucis comparabilem.

‡ This is related by Jacob Fabricius, in the preface to the treatise of his brother George Fabricius *de metallicis rebus*, which may be found in Gesner's collection before quoted.

§ This catalogue is printed in Œuvres de B. Palissy. Par M. Faujas de Saint-Fond et Gobet. Paris 1777, 4to. p. 691. Compare Physikal.-ökonom. Bibliothek, vol. viii. p. 311.

---

* Mercati Metallotheca. Romæ 1717, fol. When an appendix was published to the Metallotheca in 1719, the work received a new title-page, with the date of that year, and the following addition: Cui accessit appendix cum xix recens inventis iconibus. This, therefore, answers the question proposed in *Deliciæ Cobresianæ*, page 108.

† Halleri Bibliotheca botanica, vol. i. p. 393.

‡ Joh. Baptistæ Olivi de reconditis et præcipuis collectaneis a Franc. Calceolario in museo adservatis testificatio ad Hieron. Mercurialem. Venet. 1584, 4to. An edition was published also at Verona in quarto, in 1593. The complete description was however first printed at Verona in a small folio, in 1622: *Musæum Calceolarianum Veronense.* Maffei, in his *Verona illustrat.* Veron. 1732. fol. p. 202, says: Calceolari ---- fu de' primi, che raccogliendo grandissima quantità d'erbe, piante, minerali, animali diseccati, droghe rare, cose impetrite, ed altre rarità naturali, formasse museo di questo genere.

§ Of this catalogue I have given some account in *Physiko-œkonom-bibliothek*, vol. i. p. 83, to which I shall now add, that it is printed entire in *Valentini Museum museorum*, vol. ii. p. 69. The life of Elias Brackenhoffer may be found in *Hannoverischen Gelehrten anzeigen* 1752, p. 1190.

CHIMNEYS.

NOTWITHSTANDING the magnificence of the Grecian and Roman architecture, which we still admire in those ruins that remain as monuments of the talents and genius of the ancient builders, it is very doubtful whether their common dwelling-houses had chimneys, that is, passages or funnels formed in the walls for conveying away the smoke from the fire-place or stoves through the different stories to the summit of the edifice; conveniencies which are not wanting in the meanest of our houses at present, and in the smallest of our villages. This question some have pretended to determine without much labour or research. How can we suppose, say they, that the Romans, our masters in the art of building, should not have devised and invented some means to keep free from smoke their elegant habitations, which were furnished and ornamented in a splendid and costly manner? How is it possible that a people who purchased ease and convenience at the greatest expense, should suffer their apartments to be filled with smoke, which must have allowed them to enjoy scarcely a moment of pleasure? And how could their cooks dress in smoky kitchens the various sumptuous dishes with which the most refined voluptuaries covered their tables? One must however be very little acquainted with the history of inventions and manners, to consider such bare conjectures as decisive proofs. It is undoubtedly certain, that many of our common necessaries were for many centuries unknown to the most enlightened nations, and that they are in part still wanting in some countries at present. Besides, it is probable, that before the invention of chimneys, other means, now forgotten, were employed to remove smoke.

The ancient mason-work still to be found in Italy does not determine the question. Of the walls of towns, temples, amphitheatres, baths, aqueducts, and bridges, there are some though very imperfect remains, in which chimneys cannot be expected; but of common dwelling-houses none are to be seen, except at Herculaneum, and there no traces of chimneys have been discovered.* The paintings and pieces of sculpture which are preserved, afford us as little information; for nothing can be perceived in them that bears the smallest resemblance to a modern chimney. If the writings of the ancients are to be referred to, we must collect from the works of the Greek and Roman authors, whatever seems allusive to the subject. This indeed has been already done by various men of learning;* but the greater part of them seem to deduce more from the passages they quote than can be admitted by those who read and examine them without prejudice. I shall here pre-

---

* Winkelmann in his Observations on the baths of the ancients.

---

* The following are the principal authors in whose works information is to be found respecting this subject:—*Octavii Ferrarii Electorum libri duo.* Patavii 1679, 4to. This work consists of short treatises on different subjects of antiquity. The ninth chapter of the first book, page 32, has for title: *Fumaria, seu fumi emissaria, vulgo caminos, apud veteres in usu fuisse, disputatur.*

Justi Lipsii Epistolarum selectarum chilias, 1613, 8vo. The place where printed not mentioned. The seventy-fifth letter in *Centuria tertia ad Belgas,* page 921, treats of chimneys, with which the author says the Greeks and the Romans were unacquainted.

Eberharti a Weyhe Parergon de camino. To save my readers the trouble which I have had in searching for this small treatise, I shall give them the following information: E. von Weyhe was a learned nobleman of our electorate, a particular account of whose life and writings may be found in *Molleri Cimbria litterata,* vol. ii. p. 970. In the year 1612 he published *Discursus de speculi origine, usu et abusu, Eberharti von Weyhe,* Hagæ Schaumburgicorum. This edition, which was not printed at Brunswick, as Moller says, contains nothing on chimneys, nor is there any thing to be found respecting them in the second inserted in *Casp. Dornavii Amphitheatrum sapientiæ Socraticæ joco-seriæ,* Hanoviæ 1619, fol. i. p. 733. But this treatise was twice printed afterwards, as an appendix to the author's *Aulicus politicus:* at Francfort in 1615, and Wolfenbuttle 1622, both times in quarto; and in both these editions, with the last of which Moller was not acquainted, may be found, at the end, *Parergon de camino, inquirendi causa adjectum.* In this short essay, which consists of only two pages, the author denies that the Jews, the Greeks, or the Romans had chimneys. Fabricius in his *Bibliograph. antiquaria* does not quote von Weyhe, either p. 1004, where he speaks of chimneys, or page 1014, where he speaks of looking-glasses.

Balthasaris Bonifacii Ludicra historia. Venetiis 1652, 4to. lib. iii. cap. 23. *de caminis,* p. 109. What this author says on the subject is of little importance.

Johannis Heringii Tractatus de molendinis eorumque jure, Francofurti 1663, 4to. In the *mantissa*, p. 137, *de caminis*.

Pauli Manutii Commentar. in Ciceronis epist. familiar. lib. vii. epist. 10, decides against chimneys, and speaks of the manner of warming apartments.

Petronii Satyricon, *curante P. Burmanno*, Amstelædami 1743, 4to. vol. i. p. 836. Burmann, on good grounds, is of opinion, that the ancients had not chimneys.

Mat. Martini Lexicon philologicum. Francofurti 1655, fol. under the article *Caminus*.

Pancirollus de rebus deperditis, edit. Salmuth. vol. i. tit. 33. p. 77.

L'antiquité expliquée, par Bernard de Montfaucon. première partie, page 102. Montfaucon believes that the ancients had chimneys.

Sam. Pitisci Lexicon antiquitatum Romanarum, Leovardiæ 1713, 2 vol. fol. i. pag. 335. The whole article *caminus* is transcribed from Lipsius, Ferrarius, and others, without the author's own opinion.

Antiquitates Italicæ medii ævi, auctore Muratorio, tom. ii. dissert. 25. p. 418.

Constantini Libri de ceremoniis aulæ Byzantinæ, tomus secundus, Lipsiæ 1754, fol. *in Reiskii Commentar.* p. 125.

Encyclopédie, tome troisième, Paris 1753, fol. p. 281.

Deutsche Encyclopedie, vierter band, Frankfurt 1780, 4to. p. 823.

Maternus von Cilano, Abhandlung der Römischen alterthümer, vierter theil, Altona 1776, 8vo. p. 945. This author is of opinion that chimneys were used by the Greeks, but not by the Romans.

Bibliotheque ancienne et moderne, par Jean le Clerc, tom. xiii. pour l' année 1720, part i. p. 56. The author gives an extract from Montfaucon, which contains a great many new observations.

Dell' origine di alcune arti principali appresso i Veneziani. Venezia 1758, 4to. p. 78. This work is the production of Girolamo Zanetti.

sent them to my readers, that they may have an opportunity of judging for themselves.

We are told by Homer, that Ulysses, when in the grotto of Calypso, wished that he might see the smoke ascending from Ithaca, that is, he wished to be in sight of the island.* Montfaucon is of opinion that this wish is unintelligible unless it be allowed that the houses of Ithaca had chimneys. But cannot smoke be seen to rise also when it makes its way through doors and windows? When navigators at sea observe smoke arising, they conclude that they are in the neighbourhood of inhabited land; but no one undoubtedly will thence infer, that the habitations of the people have chimneys.

Herodotus † relates that a king of Lebæa, when one of his servants asked for his wages, offered him in jest the sun, which at that time shone into the house through the chimney, as some have translated the original; but it appears that what is here called chimney, was nothing more than an opening in the roof, under which, perhaps, the fire was made in the middle of the edifice. Through a high chimney, of the same form as those used at

---

Raccolta d' opuscoli scientifici e filologici. Venezia 1752, 12mo. tom. xlvii. A treatise on chimneys by Scip. Maffei is to be found page 67.

* — — — — — αυταρ Οδυσσευς
Ιεμενος και καπνον αποθρωσκοντα νοησαι
Ης γαιης. Odyss. lib. i. ver. 58.

† Κατα την καπνοδοκην ες τον οικον εσεχων ὁ ἡλιος. Lib. viii. c. 137.

present, the sun certainly could not throw his rays on the floor of any apartment.

In the *Vespæ* of Aristophanes,[*] old Philocleon wishes to escape through the kitchen. Some one asks, "What is that which makes a noise in the "chimney?" "I am the smoke," replies the old man, "and am endeavouring to get out at the "chimney." This passage, however, which, according to the usual translation, seems to allude to a common chimney, can, in my opinion, especially when we consider the illustration of the scholiasts,[†] be explained also by a simple hole in the roof, as Reiske has determined; and indeed this appears to be more probable, as we find mention made of a top or covering [‡] with which the hole was closed.

In a passage of the poet Alexis, who lived in the time of Alexander the Great, quoted by Athenæus,[§] some one asks, "Boy, is there a kitchen? "Has it a chimney?"—"Yes, but it is a bad "one—the eyes will suffer." The question here alludes without doubt to a passage for carrying off smoke; but information is not given us sufficient to determine its form and construction. Athenæus has preserved also a passage of the poet Diphilus,* in which a parasite says, when he is invited to the house of a rich man, he does not look at the magnificence of the building, or the elegance of the furniture, but to the smoke of the kitchen. "If I see it," adds he, "rising up in "abundance, quick and in a straight column, my "heart is rejoiced, for I expect a good supper." In this passage, however, which according to Marternus is clearly in favour of chimneys, I can find as little proof as in the words of the poet Sosipater, quoted likewise by Athenæus,† who reckons the art of determining which way the wind blows to be a part of the knowledge requisite in a perfect cook. "He must know," says he, "to "discover from what quarter it comes, for when "the smoke is driven about it spoils many kinds "of dishes." Instead of agreeing with Ferrarius that this quotation seems to show that the houses of the ancients were provided with chimneys, I conclude rather from it, that they were not; for, had there been chimneys in their kitchens, the cooks must have left the smoke to make its way through them without giving themselves any trouble; but if they were destitute of these conveniencies, it would be necessary for them to afford it some other passage; it would consequently be the business of the cook, to consider on what side it would be most advantageous to open a door or a window; and in this he would undoubtedly be guided by the direction of the wind. That this really was the case, appears from a Greek epigram, which, by an ingenious thought, gives us an idea of the passage of smoke through a window.*

---

[*] Aristoph. in Vespis, ver. 139. 'Ο γὰρ πατηρ εις τον ιπνον εισεληλυθε, Pater ingressus est furnum - - - Τι ποτ' αρ' ἡ καπνη ψοφει; quid instrepit fumarium? Καπνος· εγωγ' εξερχομαι. Fumus; egressum aucupo.

[†] The scholiast explains καπνη by καπνοδοχη. Εστι δε σωληνοειδες επι των μαγειριων: fumi receptaculum instar tubi, seu canalis, super culinam. The scholiast here undoubtedly mentions a chimney. But in what century did he live?

[‡] Τηλια.

[§] Παιδες, οπτανειον εστιν; εστι, και καπνην εχει. - - - αλλ' εχει καπνην, εχει κακον. Athen. lib. ix. p. 386.

---

* Ατενες δε τηρω του μαγειρου τον καπνον. Intentis oculis aspicio coqui fumum. Si directo impetu vehemens excurrit, gaudeo, lætor, exulto; sin obliquus et tenuis, animadverto protinus illam mihi futuram cœnam absque sanguine. *Athenæus*, lib. vi. p. 236.

† Culinam recte statui, et lucis accipere quod satis est, ac unde ventus aspiret contemplari, præbet ad hoc utilitatis plurimum. Fumus enim huc illuc jactatus, discrimen aliquod afferre interdum solet dum coquuntur obsonia. *Athenæus*, lib. ix. p. 378.

These, as far as I know, are all the passages which have been collected from Greek authors respecting this question. But instead of proving that the houses of the ancients were built with chimneys, they seem much rather to show the contrary: especially when we consider what the Roman writers have said on the same subject;

---

* Τὸν λεπτον φυσωντα το πυρ Προκλον ηρεν ὁ καπνος,
Και δια των θυριδων ενθεν απηλθεν εχων;
Αλλα μολις νεφελη προσενηξατο και δι εκεινης
Προσκατεβη τρωθεις μυρια ταις ατομοις.

Proclum tenuem sufflantem ignem fumus rapuit,
Et per fenestellas abiit in aera,
Ubi cum vix per nubes descendisset,
Vulneribus millibus ab atomis est affectus.
Antholog. lib. ii. cap. 32. p. 229.

for the information of the latter, taken together, affords good grounds to believe that no chimneys were to be found in the houses at Rome, at least at the time when these authors wrote; and this certainly would not have been the case had the Romans ever seen chimneys among the Greeks. I shall now lay before my readers those passages which appear on the first view to refute my conjecture.

When the triumviri, says Appian,* caused those who had been proscribed by them to be sought out by the military, some of them, to avoid the bloody hands of their persecutors, hid themselves in wells, and others, as Ferrarius translates the words, *in fumaria sub tecto, qua scilicet fumus e tecto evolvitur.*† The true translation, however, is *fumosa cœnacula.* The principal persons of Rome endeavoured to conceal themselves in the smoky apartments of the upper story under the roof, which, in general, were inhabited only by poor people; and this seems to be confirmed by what Juvenal‡ expressly says, *Rarus venit in cœnacula miles.*

Those passages of the ancients which speak of smoke rising up from houses have with equal impropriety been supposed to allude to chimneys, as if the smoke could not make its way through doors and windows. Seneca[*] writes: "Last "evening I had some friends with me, and on "that account a stronger smoke was raised; not "such a smoke, however, as bursts forth from the "kitchens of the great, and which alarms the "watchmen, but such a one as signifies that "guests are arrived." Those whose judgments are not already warped by prejudice, will undoubtedly find the true sense of these words to be, that the smoke forced its way through the kitchen windows. Had the houses been built with chimney-funnels, one cannot conceive why the watchmen should have been alarmed when they observed a stronger smoke than usual arising from them; but as the kitchens had no conveniencies of that kind, an apprehension of fire, when extraordinary entertainments were to be provided in the houses of the rich for large companies, seems to have been well founded; and on such occasions people appointed for that purpose were stationed in the neighbourhood to be constantly on the watch, and to be ready to extinguish the flames in case a fire should happen.[†] There are many other passages to be found in Roman authors of the like kind, which it is hardly necessary to mention, such as that of Virgil:[*]

---

* De bellis civil. lib. iv. p. 962. edit. Tollii.

† Ες καπνωδεις ὑπωροφιας ἢ των τεγων ταις κεραμισι βυομεναις.

---

[*] Intervenerunt quidam amici, propter quos major fumus fieret; non hic qui erumpere ex lautorum culinis, et terrere vigiles solet, sed hic modicus qui hospites venisse significaret. *Epist.* 64.

[†] Such fire-watchmen were appointed by the emperor Augustus: Adversus incendia excubias nocturnas vigilesque commentus est. *Sueton. in Vit. Octav. August.* cap. 30. That these watchmen, whom the soldiers through ridicule called *Sparteoli*, were stationed in the neighbourhood of houses where there were grand entertain-

> Et jam summa procul villarum culmina fumant.

and the following words of Plautus,[†] descriptive of a miser:

> Quin divûm atque hominum clamat continuo fidem,
> Suam rem periisse, seque eradicarier,
> De suo tigillo fumus si qua exit foras.

If there were no funnels in the houses of the ancients to carry off the smoke, the directions given by Columella to make kitchens so high that the roof should not catch fire, was of the utmost importance.[‡] An accident of the kind, which that author seems to have apprehended, had almost happened at Beneventum, when the landlord who entertained Mæcenas and his company was making a strong fire in order to get some birds sooner roasted:

> — — — — ubi sedulus hospes
> Pæne arsit, macros dum turdos versat in igne;

---

ments, is proved by *Tertulliani Apologet.* cap. xxxix. p. 188, edit. De la Cerda. Compare also Casaubon's annotations on the passage of Suetonius above quoted.

[*] Eclog. i. ver. 83.

[†] Aulular. act. ii. sc. 4.

[‡] At in rustica parte, magna et alta culina ponatur, ut et contignatio careat incendii periculo, et in ea commode familiares omni tempore anni morari queant. *De re rustica*, lib. i. cap. 6.

various sumptuous dishes with which the most refined voluptuaries covered their tables? One must however be very little acquainted with the history of inventions and manners, to consider such bare conjectures as decisive proofs. It is undoubtedly certain, that many of our common necessaries were for many centuries unknown to the most enlightened nations, and that they are in part still wanting in some countries at present. Besides, it is probable, that before the invention of chimneys, other means, now forgotten, were employed to remove smoke.

The ancient mason-work still to be found in Italy does not determine the question. Of the walls of towns, temples, amphitheatres, baths, aqueducts, and bridges, there are some though very imperfect remains, in which chimneys cannot be expected; but of common dwelling-houses none are to be seen, except at Herculaneum, and there no traces of chimneys have been discovered.* The paintings and pieces of sculpture which are preserved, afford us as little information; for nothing can be perceived in them that bears the smallest resemblance to a modern chimney. If the writings of the ancients are to be referred to, we must collect from the works of the Greek and Roman authors, whatever seems allusive to the subject. This indeed has been already done by various men of learning;* but the greater part of them seem to deduce more from the passages they quote than can be admitted by those who read and examine them without prejudice. I shall here pre-

---

* Winkelmann in his Observations on the baths of the ancients.

---

* The following are the principal authors in whose works information is to be found respecting this subject:—*Octavii Ferrarii Electorum libri duo.* Patavii 1679, 4to. This work consists of short treatises on different subjects of antiquity. The ninth chapter of the first book, page 32, has for title: *Fumaria, seu fumi emissaria, vulgo caminos, apud veteres in usu fuisse, disputatur.*

Justi Lipsii Epistolarum selectarum chilias, 1613, 8vo. The place where printed not mentioned. The seventy-fifth letter in *Centuria tertia ad Belgas,* page 921, treats of chimneys, with which the author says the Greeks and the Romans were unacquainted.

Eberharti a Weyhe Parergon de camino. To save my readers the trouble which I have had in searching for this small treatise, I shall give them the following information: E. von Weyhe was a learned nobleman of our electorate, a particular account of whose life and writings may be found in *Molleri Cimbria litterata,* vol. ii. p. 970. In the year 1612 he published *Discursus de speculi origine, usu et abusu, Eberharti von Weyhe,* Hagæ Schaumburgicorum. This edition, which was not printed at Brunswick, as Moller says, contains nothing on chimneys, nor is there any thing to be found respecting them in the second inserted in *Casp. Dornavii Amphitheatrum sapientiæ Socraticæ joco-seriæ,* Hanoviæ 1619, fol. i. p. 733. But this treatise was twice printed afterwards, as an appendix to the author's *Aulicus politicus:* at Francfort in 1615, and Wolfenbuttle 1622, both times in quarto; and in both these editions, with the last of which Moller was not acquainted, may be found, at the end, *Parergon de camino, inquirendi causa adjectum.* In this short essay, which consists of only two pages, the author denies that the Jews, the Greeks, or the Romans had chimneys. Fabricius in his *Bibliograph. antiquaria* does not quote von Weyhe, either p. 1004, where he speaks of chimneys, or page 1014, where he speaks of looking-glasses.

Balthasaris Bonifacii Ludicra historia. Venetiis 1652, 4to. lib. iii. cap. 23. *de caminis,* p. 109. What this author says on the subject is of little importance.

Johannis Heringii Tractatus de molendinis eorumque jure, Francofurti 1663, 4to. In the *mantissa*, p. 137, *de caminis*.

Pauli Manutii Commentar. in Ciceronis epist. familiar. lib. vii. epist. 10, decides against chimneys, and speaks of the manner of warming apartments.

Petronii Satyricon, curante P. Burmanno, Amstelædami 1743, 4to. vol. i. p. 836. Burmann, on good grounds, is of opinion, that the ancients had not chimneys.

Mat. Martini Lexicon philologicum. Francofurti 1655, fol. under the article *Caminus*.

Pancirollus de rebus deperditis, edit. Salmuth. vol. i. tit. 33. p. 77.

L'antiquité expliquée, par Bernard de Montfaucon. première partie, page 102. Montfaucon believes that the ancients had chimneys.

Sam. Pitisci Lexicon antiquitatum Romanarum, Leovardiæ 1713, 2 vol. fol. i. pag. 335. The whole article *caminus* is transcribed from Lipsius, Ferrarius, and others, without the author's own opinion.

Antiquitates Italiæ medii ævi, auctore Muratorio, tom. ii. dissert. 25. p. 418.

Constantini Libri de ceremoniis aulæ Byzantinæ, tomus secundus, Lipsiæ 1754, fol. *in Reiskii Commentar.* p. 125.

Encyclopédie, tome troisième, Paris 1753, fol. p. 281.

Deutsche Encyclopedie, vierter band, Frankfurt 1780, 4to. p. 823.

Maternus von Cilano, Abhandlung der Römischen alterthümer, vierter theil, Altona 1776, 8vo. p. 945. This author is of opinion that chimneys were used by the Greeks, but not by the Romans.

Bibliotheque ancienne et moderne, par Jean le Clerc, tom. xiii. pour l' année 1720, part i. p. 56. The author gives an extract from Montfaucon, which contains a great many new observations.

Dell' origine di alcune arti principali appresso i Veneziani. Venezia 1758, 4to. p. 78. This work is the production of Girolamo Zanetti.

sent them to my readers, that they may have an opportunity of judging for themselves.

We are told by Homer, that Ulysses, when in the grotto of Calypso, wished that he might see the smoke ascending from Ithaca, that is, he wished to be in sight of the island.* Montfaucon is of opinion that this wish is unintelligible unless it be allowed that the houses of Ithaca had chimneys. But cannot smoke be seen to rise also when it makes its way through doors and windows? When navigators at sea observe smoke arising, they conclude that they are in the neighbourhood of inhabited land; but no one undoubtedly will thence infer, that the habitations of the people have chimneys.

Herodotus † relates that a king of Lebæa, when one of his servants asked for his wages, offered him in jest the sun, which at that time shone into the house through the chimney, as some have translated the original; but it appears that what is here called chimney, was nothing more than an opening in the roof, under which, perhaps, the fire was made in the middle of the edifice. Through a high chimney, of the same form as those used at

---

Raccolta d' opuscoli scientifici e filologici. Venezia 1752, 12mo. tom. xlvii. A treatise on chimneys by Scip. Maffei is to be found page 67.

* — — — — — αυταρ Οδυσσευς
Ιεμενος και καπνον αποθρωσκοντα νοησαι
Ης γαιης. Odyss. lib. i. ver. 58.

† Κατα την καπνοδοχην ες τον οικον εσεχων ὁ ἡλιος. Lib. viii. c. 137.

As the houses of the ancients were so smoky, it may be easily comprehended how, by means of smoke, they could dry and harden, not only various articles used as food, but also different pieces of timber employed for making all sorts of large and small implements. In this manner was prepared the wood destined for ploughs, waggons, and ships, and particularly that of which rudders were formed. * For this reason pantries for flesh and wine, and also coops to hold fowls, which were said to thrive by smoke, were constructed near the kitchen, where it always abounded; † and on the other hand it was necessary to remove to a distance from kitchens, apartments destined for the purpose of preserving such articles as were liable

---

for though this may be the case in some villages, the houses of the common people in our cities may be called dirty rather than smoky. These passages of Roman authors speak principally of town-houses. The house in which Horace wished to entertain his Phyllis was not a mean one, for, he tells her a little before, *Ridet argento domus.*

* Πηδαλιον δ' ευεργες ὑπερ καπνου κρεμασασθαι.

Clavum fabrefactum super fumum suspendito.

Hesiodi Opera et Dies, ver. 627.

Virgil says the same thing:

Et suspensa focis exploret robora fumus.

Georg. lib. i. 175.

† Apothecæ recte superponentur his locis, unde plerumque fumus exoritur, quoniam vina celerius vetustescunt quæ fumi quodam tenore præcocem maturitatem trahunt. *Columella*, i. 6, 20. p. 406. Gallinaria juncta sint ea furno, vel culinæ, ut ad avem perveniat fumus, qui est huic generi præcipue salutaris - - - - Huic autem focus applicetur tam longus, ut nec impediat prædictos aditus, et ab eo fumus perveniat in utramque cellam. Lib. viii. cap. 3. p. 636.

alludes without doubt to a passage for carrying off smoke; but information is not given us sufficient to determine its form and construction. Athenæus has preserved also a passage of the poet Diphilus,* in which a parasite says, when he is invited to the house of a rich man, he does not look at the magnificence of the building, or the elegance of the furniture, but to the smoke of the kitchen. "If I see it," adds he, "rising up in "abundance, quick and in a straight column, my "heart is rejoiced, for I expect a good supper." In this passage, however, which according to Maternus is clearly in favour of chimneys, I can find as little proof as in the words of the poet Sosipater, quoted likewise by Athenæus,† who reckons the art of determining which way the wind blows to be a part of the knowledge requisite in a perfect cook. "He must know," says he, "to "discover from what quarter it comes, for when "the smoke is driven about it spoils many kinds "of dishes." Instead of agreeing with Ferrarius that this quotation seems to show that the houses of the ancients were provided with chimneys, I conclude rather from it, that they were not; for, had there been chimneys in their kitchens, the cooks must have left the smoke to make its way through them without giving themselves any trouble; but if they were destitute of these conveniencies, it would be necessary for them to afford it some other passage; it would consequently be the business of the cook, to consider on what side it would be most advantageous to open a door or a window; and in this he would undoubtedly be guided by the direction of the wind. That this really was the case, appears from a Greek epigram, which, by an ingenious thought, gives us an idea of the passage of smoke through a window.*

---

* Ατενες δε τηρω του μαγειρου τον καπνον. Intentis oculis aspicio coqui fumum. Si directo impetu vehemens excurrit, gaudeo, lætor, exulto; sin obliquus et tenuis, animadverto protinus illam mihi futuram cœnam absque sanguine. *Athenæus*, lib. vi. p. 236.

† Culinam recte statui, et lucis accipere quod satis est, ac unde ventus aspiret contemplari, præbet ad hoc utilitatis plurimum. Fumus enim huc illuc jactatus, discrimen aliquod afferre interdum solet dum coquuntur obsonia. *Athenæus*, lib. ix. p. 378.

These, as far as I know, are all the passages which have been collected from Greek authors respecting this question. But instead of proving that the houses of the ancients were built with chimneys, they seem much rather to show the contrary: especially when we consider what the Roman writers have said on the same subject;

---

* Τον λεπτον φυσωντα το πυρ Προκλον ηρεν ὁ καπνος,
Και δια των ϑυριδων ενθεν απηλθεν εχων;
Αλλα μολις νεφελη προσενηξατο και δι εκεινης
Προσκατεϐη τρωθεις μυρια ταις ατομοις.

Proclum tenuem sufflantem ignem fumus rapuit,
Et per fenestellas abiit in aera,
Ubi cum vix per nubes descendisset,
Vulneribus millibus ab atomis est affectus.
Antholog. lib. ii. cap. 32. p. 229.

particular warehouses at Rome, called *tabernæ coctiliariæ*, and the preparing as well as the selling of it formed an employment followed by the common people, and which, as we are told, was carried on by the father of the emperor Pertinax.* When it was necessary to kindle fire without wood prepared in that manner, an article probably too expensive for indigent families, we find complaints of smoke which brought on a watering of the eyes; and this was the case with Horace at

---

tit. 16. 167, *de verb. significat.* where Ulpian repeats the same words. Trebellius Pollio in *Vita Claudii*, where an account is given of the firing allowed to him when a tribune by the emperor: Ligni quotidiani pondo mille, si est copia; sin minus, quantum fuerit et ubi fuerit; coctilium quotidiana batilla quatuor. It appears from this passage that wood was given out or sold by weight, as it is at present at Amsterdam. On the other hand, the *coctilia* were measured like coals. *Martial. Epigram.* lib. xiii. ep. 15: Ligna acapna.

Si vicina tibi Nomento rura coluntur,
Ad villam moneo, rustice, ligna feres.

It would seem that in the above-mentioned neighbourhood there was no wood proper for fuel, so that people were obliged to purchase that which had been dried. Some hence conclude that the *acapna* must not have been dear, because it is recommended to a countryman. But the advice here given is addressed to the possessor of a farm who certainly could afford to purchase dried wood.

* Nam pater ejus tabernam coctiliciam (coctiliariam) in Liguria exercuerat. Sed postquam in Liguriam venit, multis agris coemptis, tabernam paternam, manente forma priore, infinitis ædificiis circumdedit; fuitque illic per triennium, et mercatus est per suos servos. *Jul. Capitol. in Vita Pertin.* cap. iii. Capitolinus says before, that the father carried on *lignariam negotiationem*. See the annotations of Saumaise and Casaubon.

a paltry inn where he happened to stop when on a journey.*

The information which can be collected from the Greek and Roman authors respecting the manner in which the ancients warmed their apartments, however imperfect, nevertheless shows that they commonly used for that purpose a large fire-pan or portable stove, in which they kindled wood, and, when the wood was well lighted, carried it into the room, or which they filled with burning coals. When Alexander the Great was entertained by a friend in winter, as the weather was cold and raw, a small fire-bason was brought into the apartment to warm it. The prince, observing the size of the vessel, and that it contained only a few coals, desired his host, in a jeering manner, to bring more wood or frankincense, giving him thus to understand that the fire was fitter for burning perfumes than to produce heat.† Anacharsis, the Scythian philosopher, though displeased with many of the Grecian customs, praised the Greeks, however, because they shut out the smoke and brought only fire into their houses.* We are informed by Lampridius, that the extravagant Heliogabalus caused to be burned in these stoves, instead of wood, Indian spiceries and costly perfumes.† It is also worthy of notice, that coals were found in some of the apartments of Herculaneum, as we are told by Winkelmann, but neither stoves nor chimneys. As in Persia and other countries of the East no stoves made in the European manner are used at present; and as it is certain that the manners, customs, and furniture of the early ages have been retained there almost without variation, we have reason to suppose that the methods employed by the inhabitants for warming themselves are the same as those used by the ancients. They agree perfectly with the descriptions given by the Greek and Roman authors, and serve in some measure to illustrate them. I shall therefore here insert the account given by De la Valle, as it is the clearest and most to the purpose.‡

---

* — — — — nisi nos vicina Trivici
Villa recepisset, lacrimoso non sine fumo,
Udos cum foliis ramos urente camino.
Horat. lib. i. sat. 5, 79.

Plutarch. Sympos. lib. ii. cap. 1. Laco gymnasii præfecto, qui ligna non fumantia, ακαπνα ξυλα, præbuerat, id se vitio dare simulans, Horum caussa, inquit, apud vos non licuit lacrimare.

† Hyeme in magno gelu exceptus convivio ab amico quodam, cum is focum ignemque exiguum (εσχαραν δε μικραν και πυρ ολιγον) intulisset, aut ligna eum, aut thus adferre jussit. *Plutarch. Apophthegm.* p. 180.

"The Persians," says he "make fires in their "apartments, not in chimneys as we do, but in

---

[*] Anacharsis ille sapiens, alia Græcorum instituta reprehendens, prunas laudavit, quod, fumo excluso, domi ignem portarent. *Plutarch. Sympos.* lib. vi. 7. p. 692.

[†] Odores Indieos sine carbonibus ad vaporandas zetas jubebat incendi. *Æl. Lamprid. Vita Heliogab.* cap. 31.

[‡] Reisen des Della Valle. Genf, 1674, fol. vol. ii. p. 8.

"stoves in the earth, which they call *tennor*. "These stoves consist of a square or round hole, "two spans or a little more in depth, and in "shape not unlike an Italian cask. That this "hole may throw out heat sooner, and with more "strength, there is placed in it an iron vessel of "the same size, which is either filled with burning coals, or a fire of wood and other inflammable substances is made in it. When this is "done, they place over the hole or stove a "wooden top, like a small low table, and spread "above it a large coverlet quilted with cotton, "which hangs down on all sides to the floor. "This covering condenses the heat, and causes it "to warm the whole apartment. The people "who eat or converse there, and some who sleep "in it, lie down on the floor above the carpet, and "lean, with their shoulders against the wall, on "square cushions, upon which they sometimes "also sit; for the *tennor* is constructed in a place "equally distant from the walls on both sides. "Those who are not very cold, only put their feet "under the table or covering; but those who require more heat can put their hands under it, or "creep under it altogether. By these means the "stove diffuses over the whole body, without causing uneasiness to the head, so penetrating and "agreeable a warmth, that I never in winter "experienced any thing more pleasant. Those, "however, who require less heat let the coverlet

" hang down on their side to the floor, and enjoy " without any inconvenience from the stove the " moderately heated air of the apartment. They " have a method also of stirring up or blowing the " fire when necessary, by means of a small pipe " united with the *tennor* or stove under the earth, " and made to project above the floor as high as " one chooses, so that the wind when a person " blows into it, because it has no other vent, acts " immediately upon the fire like a pair of bellows. " When there is no longer occasion to use this " stove, both holes are closed up, that is to say, " the mouth of the stove and that of the pipe " which conveys the air to it, by a flat stone made " for that purpose. Scarcely any appearance of " them is then to be perceived, nor do they occa- " sion inconvenience, especially in a country " where it is always customary to cover the floor " with a carpet, and where the walls are plastered. " In many parts these stoves are used to cook vic- " tuals, by placing kettles over them. They are " employed also to bake bread, and for this pur- " pose they are covered with a large broad metal " plate, on which the cake is laid; but if the bread " is thick and requires more heat, it is put into " the stove itself."*—I shall here remark, that the

---

* See *Taverniers Reisan*, Genf, 1681, fol. vol. i. p. 276; *Olearius Reisebeschreibung*, Hamburg 1696, fol. vol. i. p. 291; *Schweiggers Reisebeschreibung nach Constantinopel und Jerusalem*, p. 264; *Voyage de Chardin*, Rouen 1723, 12mo. vol. iv. p. 236; *Voyage*

Jews used such stoves in their houses, and the priests had them also in the temple.*

Those who have employed their talents on this subject before me, have collected a great many passages from the Greek and Roman writers which speak of fires made for the purpose of affording warmth: but as they contain nothing cer-

---

litteraire de la Grèce, par M. Guys, Paris 1776, 2 vol. 8vo. i. p. 34. Because this author is one of the latest who has taken the trouble to compare the manners of the ancient and modern Greeks, I shall here give his account at full length. „The Greeks have no chimneys in the apartments of their houses; they make use only of a chaffing-dish, which is placed in the middle of the apartment to warm it, or for the benefit of those who choose to approach it. This custom is very ancient throughout all the East. The Romans had no other method of warming their chambers; and it has been preserved by the Turks. Λαμπτιρ, says Hesychius, was a chaffing-dish placed in the middle of a room, on which dry wood was burned to warm it, and resinous wood to give light. This chaffing-dish was supported, as those at present, by a tripod: lamps were not introduced till long after. To secure the face from any inconvenience, and from the heat of the chaffing-dish, oftentimes dangerous, the *tendour* was invented. This is a square table under which the fire is placed. It is covered with a carpet which hangs down to the floor, and with another of silk, more or less rich, by way of ornament. People sit around it either on a sofa or on the pavement, and they can at the same time put their hands and their feet under the covering, which, as it encloses the chaffing-dish on all sides, preserves a gentle and lasting heat. The tendour is destined principally for the use of the women, who during the winter pass the whole day around it, employed either in embroidering or in receiving the visits of their friends.

* As a proof of this, Faber in his *Archæologie der Hebräer,* Halle 1773, 8vo. p. 432, quotes *Kelim,* v. 1, and Maimonides and Bartenora, p. 36, *Tamid,* c. 50. Compare *Othon. Lex Rabbin.* p. 85.

tain or decisive, I shall not here enlarge upon them.* Though one or more expressions may

---

* As it would be tedious to transcribe all these passages, I shall, as examples, give only the following:

> Dissolve frigus, ligna super foco
> Large reponens.
>
> *Horat.* lib. i. od. 9, 5.

These line sshow that the poet had an aversion to cold when enjoying his bottle, and that he wished for a good fire; but they do not inform us whether the hearth, *focus*, had a chimney. We learn as little from the advice of *Cato*, c. 143, p. 104: Focum purum circumversum quotidie, priusquam cubitum eat, habeat. It was certainly wholesome to rake the fire together at night, but it might have burned either with or without a chimney. *Columella*, lib. xi. 1. p. 744, Consuescat rusticos circa larem domini, focumque familiarem. *Cicero, Epist. famil.* lib. vii. 10: Valde metuo ne frigeas in hibernis; quam ob rem camino luculento utendum censeo. Cicero perhaps understood under that term some well-known kind of stove which afforded a strong heat. *Suetonius, in Vita Vitellii*, cap. viii: Nec ante in Prætorium rediit, quam flagrante triclinio ex conceptu camini. As Vitellius was proclaimed emperor in January, a warm dining-room was certainly necessary. *Sueton. in Vita Tiber. Ner.* cap. 74: Miseni cinis e favilla et carbonibus ad calefaciendum triclinium illatus, extinctus et jam diu frigidus exarsit repente prima vespera, atque in multam noctem pertinaciter luxit. This passage however seems to allude to a chaffing-dish filled with charcoal. *Tertullian. de pœnitentia,* lib. v. cap. 12: Quid illum fumariolum ignis æterni æstimabimus, cum fumariola quædam ejus tales flammarum ictus suscitent, ut proximæ urbes aut jam nullæ exstent, aut idem sibi de die sperent? Tertullian appears to allude here to Mount Vesuvius, and to compare it to a small *tennor*. I shall on this occasion remark, that Du Cange in his *Glossarium* quotes the word *fumariolum* from the *Parœneticum ad pœnitentiam* of the Spaniard Pacianus; but the latter takes the whole passage from Tertullian, who wrote more than a century before. *Sidonius Apollin.* lib. ii. epist. i. p. 102: A cripto porticu in hyemale triclinium venitur, quod arcuatili camino sæpe ignis animatus pulla fuligine in-appear to allude to a chimney, and even if we should conclude from them, with Montfaucon, that the ancients were acquainted with the art of constructing in mason-work elevated funnels for

---

fecit. No one can determine with certainty the meaning of *arcuatilis caminus*. A covering made of a thin plate of metal, or a screen, was perhaps placed over a portable stove; we however learn, that even where the *arcuatilis caminus* was used, the beauty of the dining-room was destroyed by smoke and soot. *Ammianus Marcell.* lib. xxv. in the end of the life of Jovian: Fertur recente calce cubiculi illiti ferre odorem noxium nequivisse, vel extuberato capite periisse succensione prunarum immensa. This in an apartment where there was a stove or a chimney would have been impossible.

The following passage of *Athenæus*, lib. xii. p. 519, will admit of various explanations: Apud Sybaritas reperta sunt cava et angusta cœnacula (πυελοι), in quibus tantisper dum mensis accumberent calore foverentur. Dalechamp thinks that πυελοι were the *poeles* of the French: Locus in ædibus hypocausto tepens, in quo per hyemem prandetur ac cœnatur, quod adversus frigora præsidium in Germania ubique adhibetur. They must consequently have been like our stoves. Casaubon, however, in his *Animad. in Athen.* lib. xii. cap. 3. p. 833, says they were bathing-tubs: *Solia aut cellæ sudatoriæ*. This opinion, which is in some measure confirmed by Suidas, who gives that meaning to πυελος; and by Jul. Pollux, in whom it occurs in the same sense more than once, is adopted by Ferrarius. Sybaritæ, *says he*, pro lectis tricliniaribus, in quibus ad mensam discumberent, alveos excogitarunt, aqua calida plenos, in quibus tanquam in lectis mensæ accumbebant, iisque corpora mergebant, ut calidæ tepore inter comedendum foverentur. Lipsius on the other hand rejects all these explanations, and considers the πυελοι to have been *thecæ, lectulorum instar, quibus supponerentur in testis carbones, ad modice calefaciendum qui incubaret.* Lipsius, therefore, means vessels similar to those which in low German are called *riken*, and which, instead of our stoves, are much used in Holland by the women, who seldom approach the chimney. The ancients were certainly acquainted with such *riken*, but they were not called πυελοι. Suidas says, Ανθρανος, το γυναικειον οποποδιον, εν ω ως δι' conveying off the smoke, it must be allowed, when we consider the many proofs which we find to the contrary, that they were, at any rate, extremely rare. As they are so convenient and useful, and can be easily constructed upon most occasions, it is impossible, had they been well known, that they should have ever been forgotten. Montfaucon says, from *caminus* is derived *chiminea* of the Spaniards; *camino* of the Italians; *cheminée* of the French; and *kamin* of the Germans; and it seems, adds he, beyond a doubt, that the name, with the thing signified, has been transmitted to us from the ancients. Though this derivation be just, the conclusion drawn from it is false. The ancient name of a thing is often given to a new invention that performs the same service. The words mill and *moulin* came from *mola;* and yet our mills were unknown to the ancients. Guys relates, that a Greek woman, seeing an European lady covered with a warm cloak, said, "That woman carries "her *tennor* about with her."

Besides the methods already mentioned, of warming apartments, the ancients had another still more ingenious, which was invented and in-

---

οπης αυτων ϑερμαινονται τοις καρβοισιν. Aithranus, dictum muliebre scabellum pedibus suppositum, in quo per foramen calefiebant carbonibus. I shall refer those who are disposed to criticise this explanation to the before-quoted passage of Aristophanes, *Vesp*. 141, where they will find του πυελου το τρημα, solii foramen, which was so wide that a man could creep through it.

troduced about the time of Seneca.* A large stove or several smaller ones were constructed in the earth under the edifice; and these being filled with burning coals, the heat was conveyed from them into dining-rooms, bed-chambers, or other apartments which one wished to warm † by means of pipes inclosed in the walls. The upper end of these steam-pipes was often ornamented with the representation of a lion's or a dolphin's head, or any other figure according to fancy, and could be opened or shut at pleasure. It appears that this apparatus was first constructed in the baths, and became extended afterwards to common use. These pipes sometimes were conducted around the whole edifice,‡ as I have seen in our theatres. Palladius advises a branch of such pipes to be conveyed under the floor of an oil-cellar, in order that it may be heated without contracting soot.[*] Such a mode of warming apartments, which approaches very near to that employed in our German stoves, would have been impossible, had the houses been without windows; and it is worthy of remark, that transparent windows, at the time Seneca lived, were entirely new. These pipes, like those of our stoves, could not fail in the course of time to become filled with soot; and as they were likely to catch fire by being overheated, laws were made forbidding them to be brought too near to the wall of a neighbouring house,[†] though there were other reasons also for this regulation. As what is here said will be better elucidated by a description of the still existing ruins of some ancient baths, I shall transcribe the following passage from Winkelmann:

---

* Quædam nostra demum prodisse memoria scimus, ut speculariorum usum, perlucente testa, clarum transmittentium lumen; ut suspensuras balneorum, et impressos parietibus tubos per quos circumfunderetur calor, qui ima simul et summa foveret equaliter. *Seneca,* ep. 90.

† Quem specularia semper ab adflatu vindicarunt, cujus pedes inter fomenta subinde mutata tepuerunt, cujus cœnationes subditus et parietibus circumfusus calor temperavit, hunc levis aura non sine periculo stringet. *Senec. de provident.* p. 138. In balneariis assa in alterum apodyterii angulum promovi, propterea quod ita erant posita, et eorum vaporarium, ex quo ignis erumpit, esset subjectum cubiculo. *Cicero ad fratrem,* lib. iii. ep. 1. Adhæret dormitorium membrum transitu interjacente, qui suspensus et tabulatus conceptum vaporem salubri temperamento huc illuc digerit et ministrat. *Plin.* lib. ii. ep. 17.

‡ Quid nunc strata solo referam tabulata, crepantes
Auditura pilas, ubi languidus ignis inerrat
Ædibus, et tenuem volvunt hypocausta vaporem?
Statii Sylv. lib. i. 5, 17.

"Of chimneys in apartments," says this author, "no traces are to be seen. Coals were found in "some of the rooms in the city of Herculaneum, "from which we may conclude that the inhabitants

---

[*] At si quis majori diligentiæ studet, subjectis hinc inde cuniculis pavimenta suspendat, et ignem suggerat fornace succensa. *Pallad. de re rust.* lib. i. 20. p. 376.

[†] Quidam Hiberus nomine, qui habet post horrea mea insulam, balnearia fecit secundum parietem communem; non licet autem tubulos habere admotos ad parietem communem. De tubulis eo amplius hoc juris est, quod per eos flamma torretur paries. *Digestor.* lib. viii. tit. 2, 13.

"used only charcoal fires for warming themselves. "In the houses of the common citizens at Naples, "there are no chimneys at present; and people of "rank there as well as at Rome, who strictly adhere to the rules laid down by physicians for preserving health, live in apartments without chimneys, and which are never heated by coal-fires. "In the villas, however, which were situated "without Rome, on eminences where the air was "purer and colder, the ancients had *hypocausta* or "stoves, which were more common perhaps than "in the city. Stoves were found in the apartments of a ruined villa, when the ground was "dug up to form a foundation for the buildings "erected there at present. Below these apartments there were subterraneous chambers, about "the height of a table, two and two under each "apartment, and close on all sides. The flat top "of these chambers consisted of very large tiles, "and was supported by two pillars, which, as well "as the tiles, were joined together, not with lime "but some kind of cement, that they might not "be separated by the heat. In the roofs of these "chambers there were square pipes made of clay, "which hung half-way down into each, and the "mouths of them were conveyed into the apartment above. Pipes of the like kind, built into "the wall of this lower apartment, rose into another in the second story, where their mouths "were ornamented with the figure of a lion's head,

" formed of burned clay. A narrow passage, of " about two feet in breadth, conducted to the " subterranean chambers, into which coals were " thrown through a square hole, and the heat " was conveyed from them by means of the before-mentioned pipes into the apartment immediately above, the floor of which was composed of coarse mosaic-work, and the walls were " incrusted with marble. This was the sweating-" apartment (*sudatorium*). The heat of this apartment was conveyed into that on the second story " by the clay pipes enclosed in the wall, which " had mouths opening into the former, as well as " the latter, to collect and afford a passage to the " heat, which was moderated in the upper apartment, and could be increased or lessened at " pleasure." Such a complex apparatus would have been unnecessary had the Romans been acquainted with our stoves.*

---

* The following passage from *And. Baccii Libr. de thermis*, Patav. 1711, fol. p. 263, contains information much of the same kind. Vestigium antiquum tubulorum ejusmodi parietibus impressorum visitur in sacrario S. Helenæ, in ecclesia S. Crucis in Hierusalem, qui sub opere tectorio quadrata forma, quatuor digitorum latitudine, ac triplici conjuncti ordine, ab imo (ut mihi videtur) hypocausto, calores in supernas ædium partes deferre debebant. See also *Franc. Robortelli Laconici seu sudationis, quæ adhuc visitur in ruina balnearum Pisanæ urbis, explicatio*, in *Thesaurus antiq. Roman.* vol. xii. p. 385. *Vitruvii de architectura libri, cum annotat. Gulielmi Philandri Castilionii.* Lugduni 1586, 4to. p. 279. Philander says that the ancients conveyed from subterranean stoves, into the apartments above, the steam of boiling water; but of this I have

I have, as yet, made no mention of a passage of the emperor Julian, which is too remarkable to be entirely omitted; though, at the same time, it is so corrupted that little can be collected from it.* Julian relates, that during his residence at Paris the winter was uncommonly severe; but that he would not allow the house in which he lived to be heated, though it had the same apparatus for that purpose as the other houses of the city. His rea-

---

found no proof. If this be true, the Roman baths must have been like the Russian sweating-baths, a description of which may be found in Mr. Schlozer's Treatise on the harmlessness of the small-pox in Russia. Gottingen 1768. 8vo.

* Erat tum hyems solito vehementior, et fluvius quasi marmoreas crustas prætervehebat, (nostis lapidem Phrygium, cui persimiles erant istius candidi lapidis crustæ concretæ, magnæ et aliæ ex aliis labentes) quin etiam fluvium conjuncturæ et tanquam pontem facturæ videbantur. Cum igitur in his rebus durior et agrestior essem quam unquam antea, nequaquam cubiculum in quo requiescebam calefieri patiebar, quo modo illic pleraque domicilia sub caminis calefiunt, cum tamen ad ignis calorem excipiendum esset opportunum.—'Ονπερ ειωθει τροπον ὑπο ται ςκαμινοις τα πολλα των οικηματων εκει θερμαινεσθαι. Και ταυτα εχων ευπρεπως προς το παραδεξασθαι την εκ του πυρος αλεαν. Quod tum quoque accidit ob meam duritiem, atque in me ipsum præcipue, ut vere dicam, inhumanitatem, qui me ad illum aerem tolerandum assuefacere volebam, ejus præsidii maxime indigentem. Cumque hyems invalesceret, atque in dies fieret vehementior, ne tum quidem famulis meis permisi, ut domicilium, το οικημα, calefacerent; veritus ne humorem, qui in parietibus erat, commoverem; itaque accensum ignem et candentes aliquot carbones, πυρ κεκαυμενον και ανθρακας λαμπρους, inferri jussi. Hi vero, etsi non multi erant, tamen multum vaporem e parietibus excitarunt, a quo cum caput meum oppletum esset, somnus me complexus est. Ac sane metui ne suffocarer. *Juliani Misopogon*, in *Juliani operibus*, Lipsiæ 1696, fol. p. 341.

son for this was, that he wished to inure himself to the climate; and he was apprehensive also, that the walls by being heated might become moist and throw out a damp vapour. He suffered, therefore, burning coals only to be brought into his apartment, which, however, occasioned pains in his head, and other disagreeable symptoms. What apparatus the houses of Paris then had for producing heat, no one can conjecture from the passage alluded to. In my opinion, they were furnished with the above-described subterranean stoves: but even if these should not be here meant, I cannot help thinking that the emperor's relation confirms that they had not chimneys like ours; for, had the case been otherwise, the cautious prince would not have exposed himself to the vapour of coals, the noxious quality and effects of which could not be unknown to him.

Though the great antiquity of chimneys is not disputed, too little information has been collected to enable us to determine, with any degree of certainty, the period when they first came into use. If it be true, as Du Cange, Vossius, and others affirm, that apartments called *caminatæ* were apartments with chimneys, these must, indeed, be very old; for that word occurs so early as the year 1069, and perhaps earlier;* but it is always found connected in such a manner as contradicts entirely the above signification.* Papias the grammarian, who wrote about 1051, explains the word *fumarium* by *caminus per quem exit fumus;* and Johannes de Janua, a monk, who about 1268 wrote his *Catholicon*, printed at Venice, says *Epicaustorium, instrumentum quod fit super ignem caussa emittendi fumum.* But these *fumaria* and *epicaustoria* may have been pipes by which the smoke, as is the case in our vent-furnaces, was conveyed through the nearest wall or window: at any rate this expression, with its explanations, can afford no certain proof that chimneys are so old;† especially as later writers give us reason to believe the contrary. Riccobaldus de Ferrara,‡ Galvano Fiamma or Flamma, a Dominican monk from Milan,§ who died in 1344 professor at Pavia, and Giovanni de Mussis, who about 1388 wrote his *Chronicon Placentinum*,‖ and all the writers of the fourteenth century, seem either to have been unacquainted with chimneys, or to have considered them as the newest invention of luxury.

---

* Zanetti, p. 78, quotes a charter of that year, in which the following words occur: Cum tota sua cella et domo, et caminatis cum suo solario, et aliis caminatis.

---

* Muratori, Antiquit. Ital. med. æv. vol. ii. p. 418.

† Such is the opinion of Muratori as above quoted. Sed ne hæc quidem satis sunt ad persuadendum, in hac re nobis tradenda deceptos fuisse scriptores supra laudatos (*who deny that the ancients had chimneys*); nam et antiquis sæculis in culinis aliisque ædium cubiculis ignis accendebatur, ac fumi inde educendi ne tunc quidem ratio desiderabatur, quamquam tempora illa caminis nostris in tectum usque productis caruisse statueremus.

‡ In Muratori, Script. Ital. vol. ix.

§ His Chronicle of the Milanese is printed in Muratori.

‖ In Muratori, vol. xvi. p. 582. Homines Placentiæ ad præsens vivunt splendide et ornate et nitide, et utuntur in domibus eorum pulcrioribus et melioribus arnixiis et vasellamentis, quam solebant a septuaginta annis retro, scilicet ab anno Christi 1320 retro: et ha-

That there were no chimneys in the tenth, twelfth, and thirteenth centuries, seems to be proved by the so called *ignitegium*, or *pyritegium*, the curfeu-bell of the English, and *couvre-feu* of the French. In the middle ages, as they are termed, people made fires in their houses in a hole or pit in the centre of the floor, under an opening formed in the roof; and when the fire was burnt out, or the family went to bed at night, the hole was shut by a cover of wood. In those periods a law was almost every where established, that the fire should be extinguished at a certain time in the evening; that the cover should be put over the fire-place; and that all the family should retire to rest, or at least be at home.* The time when this ought to be done was signified by the ringing of a bell. William the Conqueror introduced this law into Eng-

---

bent pulcriores habitationes quam tunc habebant, quia in dictis eorum domibus sunt pulcræ cameræ et caminatæ, bora, curtaricia, putei, hortuli, jardini et solaria pro majori parte; et sunt plures camini ab igne et fumo in una domo, in quibus domibus dicto tempore nullum solebat esse caminum; quia tunc faciebant unum ignem tantum in medio domus sub cupis tecti, et omnes de dicta domo stabant circum circa dictum ignem, et ibi fiebant coquina - - - - Modus edendi pro majori parte hominum Placentiæ est, quod ad primam tabulam comedit dominus domus cum uxore et filiis in caminata vel in camera ad unum ignem, et familia comedit post eos in alia parte ad alium ignem, vel in coquina pro majori parte.

* Reiske ad Ceremon. aulæ Byzant. p. 145.

land in the year 1068, and fixed the *ignitegium* at seven in the evening, in order to prevent nocturnal assemblies;* but this law was abolished by Henry I, in 1100. From this ancient practice has arisen, in my opinion, a custom in Lower Saxony of saying, when people wish to go home sooner than the company choose, that they hear the *bürgerglocke*, burghers' bell. The ringing of the curfeu-bell gave rise also to the prayer-bell, as it was called, which has still been retained in some protestant countries. Pope John XXIII, with a view to avert certain apprehended misfortunes, which rendered his life uncomfortable, gave orders that every person, on hearing the *ignitegium*, should repeat the *Ave Maria* three times.† When the appearance of a comet and a dread of the Turks afterwards alarmed all Christendom, Pope Calixtus III increased these periodical times of prayer by ordering the prayer-bell to be rung also at noon.*

---

* The following passages of old writers, collected by Du Cange, allude to this law. *Statuta Leichefeldensis ecclesiæ in Anglia*: Est autem ignitegium qualibet nocte per annum pulsandum hora septima post meridiem. *Statuta Massil.* lib. v. cap. 4: Statuimus hac præsenti constitutione perpetuo observandum, quod nullus de cætero vadat per civitatem Massiliæ vel suburbia civitatis contigua de nocte, ex quo campana, quæ dicitur Salvaterra, sonata fuerit, sine lumine. *Charta Johannis electi archiepisc. Upsaliensis*, an. 1291: Statuimus, ut nullus extra domum post ignitegium seu coverfu exeat.

† Polydor. Vergil. de rerum inventor. lib. vi. cap. 12. edit. Lugduni Batav. 1664, 12mo. p. 460. Concilium Senonense anno 1347, cap. 13: Præcipimus, quod observetur inviolabiliter ordinatio facta per S. M. Joannem P. P. XXIII. de dicendo ter Ave Maria, tempore seu hora ignitegii.

The oldest certain account of chimneys with which I am acquainted, occurs in the year 1347; for an inscription which is still existing or did exist at Venice, relates that at the above period a great many chimneys (*molti camini*) were thrown down by an earthquake.† This circumstance is confirmed by John Villani, the historian, who died at Florence in 1348, and who calls the chimneys *fumajuoli.*‡ Galeazzo Gataro, who in the

---

* Apparente per aliquot dies cometa critico et rubeo, cum mathematici ingentem pestem, caritatem annonæ, magnam aliquam cladem futuram dicerent - - - mandavit Calixtus, ut assiduo rogatu Deus flecteretur, in meridie campanis signum dari fidelibus omnibus, ut orationibus eos juvarent qui contra Turcas continuo dimicabant. Compare with the above *Hannoverische gelehrte anzeigen* 1754, *zugabe*, p. 195, where the anonymous editor makes no mention of the *ignitegium*. The year also 1357 is probably an error of the press, and ought to be read 1457; for Calixtus was not elected to the papal chair till 1455.

† Nella iscrizione in marmo posta sopra la maggior porta della scuola grande di Santa Maria della Carità, in cui si descrive il tremuoto che afflisse la nostra città nell' accennato anno 1347, si nota che caddero molti camini. *Dell' origine di alcune arti principali appresso i Veneziani.* Venezia 1758, 4to. p. 80.

‡ Nel detto anno (1347) Venerdi notte di 25 di Gennaio, furono diversi e grandissimi tremuoti in Italia, nella città di Pisa, e di Bologna, e di Padova, e maggiormente nella città di Vinegia, nella quale rovinarono infiniti fumajuoli, che ve ne havea assai e belli; e piu campanili de chiese, e altre case nella detta città s'apersono, e tali rovinarono. *In the annotations stands:* Fumajuoli vogliano dire cammini. *Historie Fiorentine di Giovan. Villani,* lib. xii. cap. 121, in *Muratori, Script. rerum Italicar.* vol. xiii. p. 1001.

Dictionary of learned men is named De Gataris, and who died of the plague in 1405, says in his History of Padua, which was afterwards improved and published by his son Andrew, that Francesco da Carraro, lord of Padua, came to Rome in the year 1368, and finding no chimneys in the inn where he lodged, because at that time fire was kindled in a hole in the middle of the floor, he caused two chimneys, like those which had been long used at Padua, to be constructed, and arched by masons and carpenters whom he had brought along with him. Over these chimneys, the first ever seen at Rome, he affixed his arms, which were still remaining in the time of Gataro.*

While chimneys continued to be built in so simple a manner, and of such a width as they are still observed to be in old houses, they were so

---

* This *Chronicon Patavinum* may be found in *Muratori, Scriptor. rerum Ital.* vol. xvii. The passage here alluded to, which occurs page 46, is as follows: Et essendo il Signore Messer Francesco da Carraro giunto per albergare nell' albergo della Luna, et in quella stanza non trovando alcun camino per fare fuoco, perchè nella città di Roma allora non si usavano camini, anzi tutti facevano fuoco in mezzo delle case in terra, e tali facevano ne i cassoni piena di terra i loro fuochi; e non parendo al Signore Messer Francesco di stare con suo commodo in quel modo, aveva menati con lui muratori, e marangoni ed ogn' altra sorta d'artefici; e subito fece fare due nappe de camini, e le arcuole in volto al costume di Padova, con l'armi sue fisse sopra esse nappe, che ancora si possono vedere; e dopo quelle da altri a i tempi indietro ne furono fatte assai; e lasciò questa memoria di se nella città di Roma.

504797

easily cleaned that this service could be performed by a servant with a wisp of straw, or a little brushwood fastened to a rope; but after the flues, in order to save room, were made narrower, or when several flues were united together, the cleaning of them became so difficult, that they required boys, or people of small size, accustomed to that employment. The first chimney-sweepers in Germany came from Savoy, Piedmont, and the neighbouring territories.* These for a long time were the only countries where the cleaning of chimneys was followed as a trade; and I am thence inclined to conjecture that chimneys were invented in Italy,† rather than that the Savoyards learned the art of climbing from the marmots or mountain-rats, as some have asserted.‡ These needy but industrious people chose and appropriated to themselves, perhaps, this occupation, because they could find no other so profitable. The Lotharingians, however, undertook this business also, and on that account the duke of Lotharingia was styled the Imperial Fire-master.* The first Germans who condescended to clean chimneys appear to have been miners; and our chimney-sweepers still procure boys from the Hartz forest, who may be easily discovered by their language. The greater part of the chimney-sweepers (*ramoneurs de cheminées*) in Paris, at present, are Savoyards; and one may see there every where in the streets large groups of their boys,† many of whom are not above eight years of age, and who, clad in linen frocks, will, when called upon, scramble up at the hazard of their lives, with their besoms and other instruments, through a narrow funnel often fifty feet in length, filled with soot and smoke, and in which they cannot breathe till they arrive at the top, in order to gain five sous; and even of this small pittance they are obliged to pay a part to their avaricious masters.‡

---

* I spazzacamini vengono communemente dalle vallate, come dal Lago di Como, dal Lago maggiore, da Valcamonica, da val Brombana, e anco dal Piemonte. *Gazoni Piazze universale.* In Venetia 1610. 4to. p. 364.

† A writer in the German Encyclopedie conjectures that the Italian architects employed in Germany to build houses and palaces of stone, brought with them people acquainted with the art of constructing larger and more commodious chimneys than those commonly used.

‡ Dictionnaire des arts et des metiers, par Jaubert, vol. iv. p. 534.

---

* Ludwig über die guldene bulle, vol. ii. p. 653.

† — — — — Ces honnêtes enfans
Qui de Savoye arrivent tous les ans,
Et dont la main légérement essuye
Ces longs canaux, engorgés par la suie.
VOLTAIRE.

‡ C'est ainsi que se ramonent toutes les cheminées de Paris; et des régisseurs n'ont enrégimenté ces petits malheureux, que pour gagner encore sur leur médiocre salaire. Puissent ces ineptes et barbares entrepreneurs se ruiner de fond en comble; ainsi que tous ceux qui ont sollicité des privileges exclusifs! *Tableau de Paris.* Hamburg 1781, tom. ii. p. 249.

HUNGARY WATER.

Hungary water is spirit of wine distilled upon rosemary, and which therefore contains the oily and strong-scented essence of that plant. To be really good the spirit of wine ought to be very strong and the rosemary fresh; and if that be the case, the leaves are as proper as the flowers, which according to the prescription of some should only be employed. It is likewise necessary that the spirit of wine be distilled several times upon the rosemary; but that process is too troublesome and expensive to admit of this water being disposed of at the low price for which it is usually sold; and it is certain that the greater part of it is nothing else than common brandy, united with the essence of rosemary in the simplest manner. In general, it is only mixed with a few drops of the oil.* For a long time past this article has been brought to us principally from France, where it is prepared, particularly at Beaucaire, Montpellier, and other places in Languedoc, in which that plant grows in great abundance.

The name, *l'eau de la reine d'Hongrie*, seems to signify that this water, so celebrated for its medicinal virtues, is an Hungarian invention; and we read in many books that the receipt for preparing it was given to a queen of Hungary by a hermit, or, as others say, by an angel, who appeared to her in a garden all entrance to which was shut, in the form of a hermit or a youth.* Some call the queen St. Isabella;† but those who pretend to be best acquainted with the circumstance affirm that Elizabeth wife of Charles Robert king of Hungary, and daughter of Uladislaus II king of Poland, who died in 1380 or 1381, was the inventress. By often washing with this spirit of rosemary, when in the seventieth year of her age, she was cured, as we are told, of the gout and an universal lameness; so that she not only lived to pass eighty, but became so lively and beautiful that she was courted by the king of Poland, who was then a widower, and who wished to make her his second wife.

---

* Pomets Aufrichtiger materialist, Leipzig 1717. fol. p. 232. Neumanns Chemie, vol. iv. p. 122.

John George Hoyer‡ says that the receipt for preparing this water, written by queen Elizabeth's own hand, in golden characters, is still preserved in the Imperial library at Vienna. But it has been already remarked by others § that Hoyer is mistaken, and that he does not properly remember the account given of the receipt. It is to be found for the first time, as far as I know, in a small book by John Prevot, which, after his death in 1631, was published by his two sons at Francfort in 1659.* Prevot, who in his writings dis-

---

* Universal lexicon, vol. xlix. p. 1340.

† Traité de la chemie, par N. le Febure. Leyde 1669. 2 vol. 12mo. i. p. 474.

‡ In his notes to Blumentrosts Haus-und-reise-apotheke. Leipzig 1716, 8vo. cap. 16. p. 47.

§ Succincta medicorum Hungariæ et Transilvaniæ biographia, ex adversariis Stephani Weszpremi. Centuriæ duo. Pars prior.

Wiennæ 1778. 8vo. p. 213. Pauli Wallaszky Conspectus reipublicæ litterariæ in Hungaria. Posonii et Lipsiæ 1785, 8vo. p. 72.

* Selectiora remedia multiplici usu comprobata, quæ inter secreta medica jure recenseas. Auctore *Joanne Prævotio*, Rauraco, in Patav. gymnasio olim medicinæ practicæ professore, et horti medici præfecto. Libellus posthumus a *Joan. Bapt.* et *Theob.* auctoris fil. in lucem editus. 12mo. In page 6 the following passage occurs: For the gout in the hands and the feet. As the wonderful virtue of the remedy given below has been confirmed to me by the cases of many, I shall relate by what good fortune I happened to meet with it. In the year 1606 I saw among the books of Francis Podacather, of a noble Cyprian family, with whom I was extremely intimate, a very old breviary, which he held in high veneration, because, he said, it had been presented by St. Elizabeth, queen of Hungary, to some of his ancestors, as a testimony of the friendship which subsisted between them. In the beginning of this book he showed me a remedy for the gout written by the queen's own hand, in the following words, which I copied:

"I Elizabeth, queen of Hungary, being very infirm and much troubled with the gout in the seventy-second year of my age, used for a year this receipt given to me by an ancient hermit whom I never saw before nor since; and was not only cured, but recovered my strength, and appeared to all so remarkably beautiful, that the king of Poland asked me in marriage, he being a widower and I a widow. I however refused him for the love of my Lord Jesus Christ, from one of whose angels I believe I received the remedy. The receipt is as follows:

> "℞. Take of aqua vitæ, four times distilled, three parts, and of the tops and flowers of rosemary two parts: put these together in a close vessel, let them stand in a gentle heat fifty

covers a bias to credulity and superstition, gives a receipt against the gout in the feet and hands, which is exactly the same as that for making the Hungary water; and says that he found it at the beginning of a breviary, which had belonged to St. Elizabeth, queen of Hungary, in her own hand-writing. This breviary was in the possession of Francis Podacather, a nobleman from Cyprus, to whose ancestors it had been given as a memorial by the queen herself.

One may easily see that Prevot mistook this Elizabeth for St. Elizabeth, the daughter of king Andrew II, who was never queen of Hungary, but died wife of a landgrave of Thuringia in 1235. But respecting Elizabeth, the wife of king Charles Robert, we know from the information of Hungarian writers* that, in her will, she really did mention two breviaries, one of which she bequeathed to her daughter-in-law, and the other to one Clara von Pukur, with this stipulation, however, that after her death it should belong to a monastery at Buda. It is not impossible, therefore,

---

hours, and then distil them. Take one dram of this in the morning once every week, either in your food or drink, and let your face and the diseased limb be washed with it every morning.

"It renovates the strength, brightens the spirits, purifies the marrow and nerves, restores and preserves the sight, and prolongs life." Thus far from the Breviary.—Then follows a confirmation which Prevot gives from his own experience.

* Medicorum Hungariæ biographia, *ut supra*, p. 214.

that one of these books may have come into the hands of Podacather's ancestors.

I must however confess, that respecting this pretended invention of the Hungarian queen I have doubts which my learned friend professor Cornides at Pest can best resolve. It may be readily conjectured that this Elizabeth must have been extremely vain; but when she wished to make posterity believe that in the seventieth, or seventy-second year of her age she became so sound and so beautiful that a king, at that time a widower, grew enamoured of her, we may justly conclude that she was more than vain—that she was perhaps childish. I have taken the trouble to search for the king, then a widower, who paid his addresses to Elizabeth, but my labour has proved fruitless. This proposal of marriage must have been made about the year 1370;[*] but Casimir III, brother of the Hungarian Elizabeth, reigned in Poland till that year, and was succeeded by her son Louis, who died after her in 1382; and the throne then remained vacant for three years.[†]

It is rather singular that the name of aqua-vitæ, and the practice of distilling spirit of wine upon aromatic herbs, should be known in Hungary so early as the fourteenth century, though I will not pretend to affirm the contrary. But I consider it as more remarkable that the botanists of the 17th century should have spoken of and extolled the various properties of rosemary without mentioning Hungary water. It cannot, however, be denied that, in the sixteenth century, long before Prevot, Zapata,* an Italian physician, taught the method of preparing spirit of rosemary: and he has even told us that it was known, though imperfectly, to Arnoldus de Villa Nova; but he does not say that it was an Hungarian invention. It appears to me most probable, at present, that the name, *l'eau de la reine d'Hongrie*, was chosen by those who in latter times prepared spirit of rosemary for sale, in order to give greater consequence and credit to their commodity; as various medicines, some years ago, were extolled in the gazettes under the title of Pompadour, though the celebrated lady from whose name they derived their importance, certainly neither ever saw them nor used them.

---

[*] In Schwandtner's *Scriptores rerum Hungaricarum*, published since 1746 in three volumes folio, the year 1381 is given, vol. i. p. 766, as the period of Elizabeth's death; but in vol. iii. p. 723, the year 1380 is mentioned.

[†] Hubner's Genealogische tabellen, i. p. 95.

---

* The book of Zapata, who is not noticed in the *Gelehrten Lexicon,* was printed at Rome, as Haller says in his *Biblioth. botan.* vol. i. p. 368, in the year 1586; and other editions are mentioned in *Boerhavii Methodus studii medici,* p. 728 and 869. I have now before me, from the library of Dr. Murray, *Joh. Bapt. Zapatæ, medici Romani, Mirabilia seu secreta medico-chirurgica - - per Davidem Spleissium.* Ulmiæ 1696. The passage above alluded to occurs in page 49, as follows: Ab Arnoldo de Villa Nova vinum rosmarini magnis laudibus celebratum componebatur, qui, ut encomii cumulum ei adderet, de Anaxagora memorat, quod in Babylone degens, ex medico quodam Saraceno satis decrepito, virtutem rosmarini summis precibus percontatus, ab ipso id responsi tulerit: se nec cuiquam secretum sibi suspiciendum revelaturum - - - - Recipe igitur mustum bonum, scilicet lixivium sponte defluens, antequam calcentur uvæ; cui vasi commisso, adde statim cymatum et foliorum rorismarini partem decimam, et sicut cum aliis fieri solet vinis, scutella perforata tegatur, ut effervescat et rorismarini virtutes extrahat. Si vero lubet, postquam aliquid musti et rorismarini in cucurbita vitrea, cujus beneficio alias quinta essentia est distillanda, simul ebullierit, quintam essentiam inde elicere; id fieri poterit; et postquam distillata fuerit, in vas mustum alterum cum roremarino, jam continens, post hujus fermentationem, est infundenda. Addita enim tam modica quintæ essentiæ hac quantitate, mustum eo fragrantius et efficacius reddetur.

CORK.

THOSE who are accustomed to value things used in common life, only according to the price for which they can be purchased, will perhaps imagine that my subject must be nearly exhausted when I think it worth my while to entertain my readers with a matter so inconsiderable. Cork, however, is a substance of such a singular property, that one has not yet been found which can be so generally employed with the same advantage; and before the use of it was known, people were obliged on many occasions to supply the want of it by means which to us would appear extremely troublesome.

Cork is a body remarkably light, can be easily compressed, expands again by its elasticity as soon as the compressing power is removed, and therefore fills or stops up very closely that space into which it has been driven by force. It may be easily cut into all forms; and though it abounds with pores, which are the cause of its lightness, it suffers neither water, beer, nor any common liquid to escape through it, and it is only very slowly and after a considerable length of time that it can be penetrated even by spirits. Its numerous pores seem to be too small to afford a passage to the finest particles of water and wine, which can with greater facility ooze through more compact wood that has larger or wider pores.

Cork is the exterior bark of a tree belonging to the genus of the oak, which grows wild in the southern parts of Europe, particularly France, Spain, Portugal, and Tuscany.* When the tree is about fifteen years old it is fit to be barked, and this can be done successively every eight years. The bark always grows up again, and its quality improves as the age of the tree increases. It is commonly singed a little over a strong fire or glowing coals, or laid to soak a certain time in water, after which it is placed under stones in order to be pressed straight. We procure the greater part of our cork from the Dutch, who bring it principally from France; but they import some also from Portugal and Spain.

---

* Duhamel, Abhandlung von bäumen und stauden, i. p. 223. Tozzetti, Viaggi, iv. p. 278.

This tree, as well as its use, was known to the Greeks and the Romans. By the former it was called *phellus.* Theophrastus reckons it among the oaks, and says that it has a thick fleshy bark, which must be stripped off every three years to prevent it from perishing. He adds, that it was so light as never to sink in water, and on that account could be used with great advantage for a variety of purposes.* The only circumstance which on the first consideration can excite any doubt of the *phellus* being our cork-tree, is, that he expressly says it lost its leaves annually, whereas our cork-tree retains them.† In another passage, however, he calls it an ever-green.‡ This apparent contradiction several commentators have endeavoured to clear up, but their labour seems unnecessary; for there is a species of our cork-tree which really drops its leaves. Linnæus did not think this species worth his notice; but it has been accurately observed by Clusius and Matthiolus,* and its existence is confirmed by Miller.† As Theophrastus,‡ Pliny,§ Varro,‖ and others mention a common oak which always retains its leaves, it appears clear to me that the first-mentioned author, where he speaks of ever-greens, meant our common species of the cork-tree, and that extraordinary kind of oak; but in the other passage that species which drops its leaves in winter.

---

* Folio non perpetuo, sed deciduo. Fructum fert assidue, eumque glandis figura ilicis feminæ similem. Detrahunt corticem, universumque dividendum censent; alioquin arborem deteriorem effici volunt. Rursum vero intra triennium repletur. *Histor. Plantar.* lib. iii. cap. 16. He repeats the same thing lib. iv. cap. 18, where he remarks as an exception, that the cork-tree does not die after it has lost its bark, but becomes more vigorous. In the southern parts of France the cork-trees are barked every eight, nine, or ten years.

† Ουκ αειφυλλον, αλλα φυλλοϐολουν.

‡ Lib. iii. cap. 4. This difficulty the commentators have endeavoured to remove by reading here φελλοδρυς instead of the two words φελλος and δρυς which are separated; and indeed φελλοδρυς occurs in other parts of the same work among the ever-greens, lib. i. cap. 15, και ἡν Αρκαδες καλουσι φελλοδρυν.

That the *suber* of the Romans was our cork-tree is generally and with justice admitted. Pliny relates of it, in the clearest manner, every thing said by Theophrastus* of the *phellus*;† and we find by his account, that cork at the period when he wrote was applied to as many purposes as at present.‡

---

* Clusius in Rar. plantar. histor. lib. i. cap. 14, describes this tree as he found it without leaves in the month of April in the Pyrenees near Bayonne. Theophrastus, p. 234, says, The cork-tree, φελλος, which drops its leaves γινεται εν Τυῤῥηνια: but the Aldine manuscript and that of Basle have Πυῤῥηνια. The latter reading is condemned by Robert Constant. and others: but though the cork-tree is indeed indigenous in Tyrrhenia or Hetruria, I see no reason why Πυῤῥηνια should not be retained, as it is equally certain that the tree grows in the Pyrenees, and that it there loses its leaves according to the observation of Clusius. If on the other hand we read Τυῤῥηνια, this is opposed by the experience of Theophrastus; for in Italy, as well as in France and Spain, the tree keeps its leaves the whole winter through. Stapel therefore has preferred the word Πυῤῥηνια. Labat, who saw the tree both in the Pyrenees and in Italy, says in his *Reise nach Welschland*, i. p. 305, that in the former it drops its leaves in winter, and in the latter preserves them.

† In his Gardener's Dictionary. Bauhin, in his *Pinax*, p. 424, mentions this species particularly.

‡ Historia plantarum, lib. i. cap. 15.

§ Lib. xvi. cap. 21.

‖ De re rustica, i. cap. 7.

At that time fishermen made floats to their nets of cork; that is, they affixed pieces of cork to the rope which formed the upper edge of the net, and which it was necessary should be kept at the surface of the water, in the same manner as is done at present.[*] This use, however, was much limited by the high price of cork; and small boards of light wood, such as that of the pine, aspen-tree, lime-tree, and poplar, were employed in its stead.[†] The German and Swedish fishermen, and also the Cossacks, use for the same purpose the bark of the black poplar; but the Dutch and Hanoverians, who fish on the Weser, employ for their nets a kind of wood called in Holland *toll-hout*. It is a wood of a reddish brown colour, extremely light, and of a very fine grain, which the Dutch, who export it to Germany, procure from the Baltic. At Amsterdam it costs a stiver per pound; but I have not yet been able to learn what wood it properly is.

---

* Lib. xvi. cap. 8.

† The botanists of the 17th century, who paid more attention to the names of the ancients than those of the present time, say that the cork-tree is in Greek called also ἴψος, or ἰψὸς, which word is not to be found in Ernesti's dictionary. I have found it only once in Theophrastus, *Histor. plantar.* lib. iii. cap. 6, where those plants are named which blow late. Because Pliny, lib. xvi. cap. 25, says, *tardissimo germine suber*; ἶψος is considered to be the same as φελλος. Hesychius however says, that ἰψὸς in some authors signifies ivy.

‡ Our German word *kork*, as well as the substance itself, came to us from Spain, where the latter is called *chorchu de alcornoque*. It is, without doubt, originally derived from *cortex* of the Latins, who gave that appellation to cork without any addition. Horace says, Od. iii. 9: *Tu levior cortice*; and Pliny tells us: *Non infacete Græci (suberem) corticis arborem appellant.* These last words are quoted by C. Stephanus in his *Prædium rusticum*, p. 578, and *Ruellius de natura stirpium*, p. 174, and again p. 256, as if the Greeks called the women, on account of their cork soles, of which I shall speak hereafter, *cortices arborum*. This gives me reason to conjecture a different reading in Pliny, and indeed I find in the same edition which, as I have already observed, I received as a present from professor Bause at Moscow, the words *cortices arborum*. This variation ought to have been remarked by Hardouin.

Another use to which cork was applied, according to Pliny, was for anchor-buoys. *Usus ejus ancoralibus maxime navium.* These words Hardouin has not explained; and Scheffer,[‡] where he speaks of anchors, and what belongs to them, takes no notice of cork. Gesner, however, has attempted an explanation,* but what he says is, in my opinion, not satisfactory. He certainly could not mean that it was employed to render anchors lighter.—According to my idea, they may be easily made light enough without cork, and perhaps they can never be made too heavy. The true explanation of this passage is, that it was used for making buoys, called *ancoralia*, which were fixed to the cable, and by floating on the surface of the water, over the anchor, pointed out the place where it lay.† Our navigators use for that purpose a large but light block of wood, which, in order that it may float better, is often made hollow.‡ A large cask is also sometimes employed. The Dutch sailors call these blocks of wood *boei* or *boeye*; and hence comes their proverb: *Hy heeft een kop als een boei*, he has a head like a buoy; he is a blockhead.

---

[*] Plin. p. 7: Usus ejus piscantium tragulis. *Tragulæ* therefore were what our fishermen call floats. *Suidas:* Phellos immersabilis aquis, semper occultum rete piscatorium quasi sorte indicans. *Sidonius, Epist.* lib. ii. 2: Piscator retia suberinis corticibus extendit. How floats are made at present may be seen by fig. 701 in Krunitz, Œconom. encyclopedie, vol. xiii.

[†] Linnæi Flora Suec. p. 358. Gmelin (junior), Reise durch Russland, i. p. 138. It is a mistake in *Duroi, Harbkescher baumzucht*, ii. p. 141, that ropes for fishing-nets are prepared from this bark.

[‡] De militia navali veterum. Upsaliæ 1654, 4to. lib. ii. cap. 5.

A third use of cork among the Romans was its being made into soles, which were put into their shoes in order to secure the feet from water, especially in winter;§ and as high heels were not then introduced, the ladies who wished to appear taller than they had been formed by nature, put plenty of cork under them.*

---

* In Stephen's Thesaurus he says: Usus ancoralibus navium; int. sustinendis, et minuendo pondere ancorarum.

† The following words of Pausanias, viii. 12. p. 623, where he speaks of the different kinds of oak in Arcadia, may serve to support my explanation. Some, says he, have a bark so light *ὥστε απ' αυτου και εν θαλασσῃ ποιουνται σημεια αγκυραις και δικτυαις*; ut ex eo anchorarum in mari indices et fundarum (retium) faciant.

‡ And to conceal contraband goods in them, of which I have seen instances during my travels.

§ Usus præterea in hiberno feminarum calceatu. *Plin.*

The practice of employing cork for making jackets to assist one in swimming, is also very old; for we are informed that the Roman whom Camillus sent to the Capitol when besieged by the Gauls, put on a light dress, and took cork with him under it, because, to avoid being taken by the enemy, it was necessary that he should swim through the Tiber. When he arrived at the river, he bound his clothes upon his head, and, placing the cork under him, was so fortunate as to succeed in his attempt.†

The most extensive and principal use of cork at present, is for stoppers to bottles. This was not entirely unknown to the Romans, for Pliny says expressly, that it served to stop vessels of every kind;‡ and instances of its being employed for that purpose may be seen in Cato* and Horace.† Its application to this use, however, seems not to have been very common, else cork-stoppers would have been oftener mentioned by the authors who have written on agriculture and cookery, and also in the works of the ancient poets. We every where find directions given to close up wine casks and other vessels with pitch, clay, gypsum, or potters-earth, or to fill the upper part of the vessel with oil or honey, in order to exclude the air from those liquors which one wished to preserve.‡ In the passages therefore already quoted, where cork is named, mention is made also of pitching. The reason of this I believe to be, that the ancients used for their wine large earthen vessels with wide mouths, which could not be stopped sufficiently close by means of cork. Wooden casks were then unknown, or at least scarce, as Italy produced little timber, otherwise these vessels would have been stopped with wood, as is the case at present. The practice of drawing off wine for daily consumption, from the large vessels into which it is first put, into such smaller vessels as can be easily corked, was then not prevalent.* The ancients drew off from their large jars into cups or pitchers whatever quantity of wine they thought necessary for the time, instead of which the moderns use bottles. It appears to have been customary at the French court, about the year 1258, when grand entertainments were given, and more wine vessels had been opened than were emptied, that the remainder became a perquisite of the *grand-bouteiller*.†

---

* Xenophon de tuenda re famil. and Clemens Alexand. lib. iii. pædag.

† Plutarchus in vita Camilli: Εσθητα δε φαυλην εχων, και φελλους ὑπ᾽ αυτῃ κομιζων, την μεν αλλην ὁδον ἡμερας αδεως διηλθεν. Εγγυς δε της πολεως γενομενος ηδη σκοταιος, επει κατα γεφυραν ουκ ην τον ποταμον περασαι, των βαρβαρων παραφυλλαττοντων, την μεν εσθητα τῃ κεφαλῃ περισπειρασας, ου πολλην ουσαν ουδε βαρειαν, τοις δε φελλοις εφεις το σώμα και συνεπικουφιζων τῳ περαιουσθαι, προς την πολιν διαβη. In the tenth volume of the *Algemeine Welthistorie* (Universal History), page 306, where this circumstance is copied from Plutarch, it is said improperly, that Cominius (so the adventurer was called) used sandal-wood, which certainly would have afforded him no assistance.

‡ Usus ejus cadorum obturamentis.

---

* Mustum si voles totum annum habere, in amphoram mustum indito, et corticem oppicato. *De re rustica*, cap. 120.

† Corticem adstrictum pice dimovebit,
Amphoræ. Lib. iii. od. 8, 10.

‡ As proofs of this may every where be found, it is hardly worth while to quote them. *Columella*, xii. 12, teaches the manner of preparing cement for stopping up wine casks. Lister says, in a note on *Apicius*, chap. 17: Vitrea nostra vasa subere, vel oleo, vel utroque diligenter obturata longe commodiora sunt ipsis antiquis artificiis, et æque secura ad omnem aeris ingressum prohibendum. The earthen wine-jars found at Pompeii appear to have had oil poured over them, and to have had no other care bestowed upon them. In Italy, even at present, large flasks have no stoppers, but are filled up with oil. See *Martini Auflebendes Pompeii*, p. 121, and Hamilton's *Entdeckungen zu Pompeii*, translated by von Murr. Nurnberg 1780, 4to. p. 19.

Stoppers of cork seem to have been first introduced after the invention of glass-bottles, and of these I find no mention before the fifteenth century; for the *amphoræ vitreæ diligenter gypsatæ* of

---

* Alexand. ab Alex. Dier. gen. v. 21. p. 302. Antiquissimi (ut Varro ait) primo utres, deinde tinas, demum vini amphoras et cupas apposuere. When the Romans went out to the chase, they carried with them some wine in a *laguncula*. *Plin. Epist.* i. 6. p. 22. Cum venabere, licebit auctore me, ut panarium et lagunculam, sic etiam pugillares feras. I do not know, however, that these flasks were of glass; all those I have seen were made of clay or wood. See *Pompa de instrum. fundi*, cap. 17, in the end of Gesner's edition of *Scriptores rei rust.* ii. p. 1187.

† Le Grand d'Aussy, Histoire de la vie privée des François, ii. p. 367.

Petronius,* to the necks of which were affixed labels, containing the name and age of the wine, appear to have been large jars, and to have formed part of the many uncommon articles by which the voluptuary Trimalchio wished to distinguish himself. It is however singular, that these convenient vessels were not thought of at an earlier period, especially as among the small funeral urns of the ancients, many are to be found which in shape resemble our bottles.† In the figure of the Syracusan wine-flasks, I think I can discover their origin from these urns. Charpentier ‡ quotes, from a writing of the year 1387, an expression which seems to allude to one of our glass-bottles; but, when attentively considered, it may be easily discovered that cups or drinking-glasses are meant. The name *boutiaux*, or *boutilles*, occurs in the French language for the first time in the fifteenth century; but were it even older, it would prove nothing, as it signified originally, and even still signifies, vessels of clay or metal, and particularly of leather.[*] Such vessels filled with wine, which travellers were accustomed to suspend from their saddles, could be stopped with a piece of wood, or closed by means of wooden or metal tops screwed on them, which are still used for earthen-pitchers. In the year 1553, when C. Stephanus wrote his *Prædium rusticum*, cork-stoppers must have been very little known, else he would not have said that in his time cork in France was used principally for soles.[†] In the time of Lottichius, rich people however had glass-flasks, with tin mouths, which could be stopped sufficiently close without cork; and these flasks appear to have been as thin as the Syracusan wine-bottles; for he adds that it was necessary to wrap them round with rushes or straw.[‡]

---

* Petron. Sat. cap. xxxiv. p. 86. Statim allatæ sunt amphoræ vitreæ diligenter gypsatæ, quarum in cervicibus pittacia erant affixa cum hoc titulo, &c. In the paintings of Herculaneum I find many wide-mouthed pitchers, with handles, like decanters, but no figure that resembles our flasks.

† Aringhi Roma subterranea. Romæ 1651, fol. i. p. 502, where may be seen an account of a flask with a round belly and a very long neck.

‡ Glossarium novum, i. p. 1182: le dit Jaquet print un contouffle de voirre, ou il avoit du vin, - - - - et de fait en but.

---

[*] Grand d'Aussy quotes from *Chronique scandaleuse de Louis* XI, "Des bouteilles de cuyr." That word however is of German extraction, though we have received it back from the French somewhat changed, like many other German things. It is evidently derived from *butte, botte, buta, buticula, buticella,* which occur in the middle ages. See *C. G. Schwarsii Exercitat. de Butigulariis.* Altorfii 1723, 4to. p. 5.

[†] Cortex ad nos plurimus defertur, muniendis adversus frigoris injuriam hieme calceamentis, p. 578.

[‡] In his observations on Petronius, p. 259, he says: Olim utribus vinum asservabant. - - - - Hodie adhuc ditiores amphoris vitreis stanneo orificio obseratis communiter utuntur, quod vinum in illis rectius servetur, neque odorem contrahat, sicut in stanneis aliisque vasibus usu venit. Accedit, quod mundiores sunt vitreæ, quia transparent, secus quam in stanneis accidit. Interim vitreæ amphoræ scorteo operimento vel involucro opus habent, ne frangantur citius; vulgo dicunt, *ein flaschenfuder*, a flasket.

In the shops of the apothecaries in Germany, cork stoppers began first to be used about the end of the 17th century. Before that period they used stoppers of wax, which were not only much more expensive but also far more troublesome.*

In latter times, some other vegetable productions have been found which can be employed instead of cork for the last-mentioned purpose. Among these is the wood of a tree common in South America, particularly in moist places, which is called there *monbin* or *monbain*, and by botanists *spondias lutea*. This wood is brought to England in great abundance for that use. The spongy root of a North-American tree, known by the name of *nyssa*, is also used for the same end,† as are the roots of liquorice, which on that account is much cultivated in Sclavonia, and exported to other countries.‡

---

* Neumann, in his Chemistry, published by Kessel, vol. iv. p. 308. The use of corks, says he, in the shops of the German apothecaries is not above forty years old.

† Die neuere wilde baumzucht in einem alphabetischen verzeichnisse aufgestellet. Leipzig 1782, 8vo. p. 30. The author is C. F. Ludewig at Leipsic.

‡ B. F. Hermann's Abritz der Oesterreichischen staaten. St. Petersburg und Leipzig, 1782, 8vo. p. 321.

APOTHECARIES.

The history of the materia medica is a subject fit to be undertaken only by physicians like Baldinger, Hensler, Mohsen,* and Gruner, who to an intimate acquaintance with what belongs to their own profession, have united a knowledge of every other branch of science. By making this acknowledgment, I wish to guard against the imputation of vanity, which I might incur as attempting to encroach on the province of such learned men. That however is not the case. My intention is only to lay before the public what I have collected respecting this subject, because I have reason to flatter myself, that, however trifling, it may be of some use until a complete history be obtained; and because I may have met with some scattered information, which, without my research, might have escaped the notice of abler writers. Whoever is acquainted with such labour, will at any rate allow that this is possible; and I hope the following essay towards a history of apothecaries will not prove unacceptable to my readers.

---

* Dr. Mohsen has already published a considerable part of what belongs to this subject in his *Geschichte der Wissenschaften in der Mark Brandenburg, besonders der Arzneywissenschaft.* Berlin 1781, 4to. p. 372. Some information also respecting the history of apothecaries may be found in *Christ. Thomasii Dissert. de jure circa pharmacopolia civitatum.* This work is printed in the second volume of his *Dissertationes Academicæ,* published at Halle in 1774, 4 vol. quarto.

That the medicines prescribed by the Greek and Roman physicians for their patients were prepared by themselves, is so well known, that I think it unnecessary to produce proofs with which no one can be unacquainted who has read Theophrastus, Hippocrates, and Galen. They caused those herbs, of which almost the whole materia medica then consisted, to be collected by others; and we have reason to believe that the gathering and selling of medicinal plants must have at an early period been converted into a distinct employment, especially as, many of them being exotics, it was necessary to procure them from remote countries, which every physician had not an opportunity of visiting; and as some of them were applied to a variety of purposes, they were sought after by others as well as by medical practitioners. Several of them were employed in cookery and for seasoning different dishes; many in dyeing and painting, some of them as cosmetics, others for perfumes, some for ointments, which were much used in the numerous baths, and not a few of them may have been employed also in other arts and manufactures. It must have been very convenient for the physicians to purchase from these dealers in herbs, such articles as they had occasion to use; but it is probable, and can even be proved, that these people soon injured them in their profession, by encroaching on their business. In the course of time they acquired a knowledge of the healing virtues of their commodities, and of the preparation they required, which was then extremely simple; and many of them began to sell compounded medicines, and to boast of possessing secrets more beneficial to mankind. To these dealers in herbs belong the *pigmentarii*, *seplasiarii*, *pharmacopolæ*, *medicamentarii*, and others who were perhaps thus distinguished by separate names on account of some very trifling circumstances in which they differed, or by dealing in one particular article more than in another.[*] Some of these names also may possibly have been used only at certain periods, or in some places more than in others; and perhaps it would be fruitless labour to attempt to define their difference correctly. That the *pigmentarii* dealt in medicines is proved by the law which established a punishment for such as sold any one poison through mistake.[*] The herbs which Vegetius[†] prescribes for the diseases of cattle were to be bought from the *seplasiarii*; and that they sold also medicines ready prepared is proved by the reproach thrown out by Pliny against the physicians of his time, that instead of making up their medicines themselves, as formerly, they purchased them from the *seplasiarii*, without so much as knowing of what they were composed.* That the *pharmacopolæ* carried on a like trade appears evident from their name; but people of judgment placed no confidence in them, and they were despised on account of their impudent boasting, and the extravagant praises they bestowed on their commodities.† The *medicamentarii* do not often occur, but we are given to understand by Pliny,‡ that they followed an employment of the same nature; and it appears that they must have been very worthless, for in the Theodosian code, male and female poisoners are called *medicamentarii* and *medicamentariæ*. §

---

[*] Alio senatusconsulto effectum est, ut pigmentarii, si cui temere cicutam, salamandram, aconitum ------ et id quod lustramenti causa dederint cantharidas, pœna teneantur hujus legis. *Digest.* lib. xlviii. tit. 8, 3, 3.

[†] Panaceam a seplasiariis comparas. *De mulomedic.* iii. 2, 21. p. 1107.

---

* Hæc omnia medici (quod pace eorum dixisse liceat) ignorant, pars major et nomina; in tantum a conficiendis medicaminibus absunt, quod esse proprium medicinæ solebat. Nunc quoties incidere in libellos, componere ex his volentes aliqua, hoc est, impendio miserorum experiri commentaria, credunt Seplasiæ omnia fraudibus corrumpenti. Jam quidem facta emplastra et collyria mercantur, tabesque mercium, aut fraus Seplasiæ sic exteritur. *Plin.* lib. xxxiv. cap. 11.

† Μιμειται που και φαρμακοπωλης ιατρον. Pharmacopola imitatur medicum, sophista philosophum, sycophanta oratorem. *Maximus Tyrius*, dissert. x. p. 121. Itaque auditis, non auscultatis, tanquam pharmacopolam; nam ejus verba audiuntur, verum ei se nemo committit, si æger est. *Cato*, in Aulus Gellius, lib. i. cap. 15.

‡ Plin. lib. xix. cap. 6.

§ Homicidam aut medicamentarium maritum suum esse probare. - - - - - Uxorem mæcham vel medicamentariam probare. *Cod. Theodos.* iii. tit. 16.

It may be readily perceived that these herb-dealers had a greater resemblance to our grocers, druggists, or mountebanks, than to our apothecaries. It is well known that the word *apotheca* signified any kind of store, magazine, or warehouse, and that the proprietor or keeper of such a store was called *apothecarius.*[*] It would be a very great mistake, therefore, if in writings of the thirteenth and fourteenth century, where these expressions occur, we should understand under the latter apothecaries such as ours are at present.[†] At these periods, those were often called apothecaries who at courts and in the houses of great people prepared for the table various preserves, particularly fruit incrusted with sugar, and who on that account may be considered as confectioners. What peculiarly distinguishes our apothecaries is, that they sell drugs used in medicine, and prepare from them different compounds according to the prescriptions given by physicians and others. But here arises a question: When did physicians begin to give up entirely the preparation of medicines to such apothecaries, who must now be more than herb-dealers, and must understand chemistry? And when did the apothecaries acquire an exclusive title to that business and to their present name? It is probable that physicians gradually became accustomed to employ such assistance for the sake of their own convenience, when they found in their neighbourhood a druggist in whose skill they could confide, and whose interest they wished to promote, by resigning in his favour that occupation.

---

[*] Proofs of this may be found in Glossarium manuale, vol. i. p. 298. From the word *apotheca* the Italians have made *boteca,* and the French *boutique.*

[†] In the *Nurnberger Bürgerbuch* mention is made of Mr. Conrade Apotheker, 1403; Mr. Hans Apotheker, 1427; and Mr. Jacob Apotheker, 1433. See *Von Murr's Jornal der Kunstgeschichte,* vi. p. 79. Henricus Apothecarius occurs as a witness at Gorlitz, in a charter of the year 1439; and one John Urban Apotheker excited an insurrection against the magistrates of Lauban in 1439. See *Buddæi Singularia Lusatica,* vol. ii. p. 424, 500. Dr. Mohsen very justly remarks, p. 378, that one cannot with any certainty determine whether these people were properly apothecaries. This observation must not be neglected in reading the following passage of Von Stetten in his *Kunstgeschichte der Stadt Augsburg,* p. 242. " In very old times there was a family here who had the name of Apotheker, and it is very probable that some of this family had kept a public apothecary's shop. Luitfried Apotheker, or *in der Apothek,* lived in the year 1285, and Hans Apotheker was in 1317 city chamberlain."

Conring asserts, without any proof, but not however without probability,* that the physicians in Africa first began to give up the preparation of medicines after their prescriptions to other ingenious men; and that this was customary so early as the time of Avenzoar in the eleventh century. Should that be the case, it would appear that this practice must have been first introduced into Spain and the lower part of Italy, as far as the possessions of the Saracens then extended, by the Arabian physicians who accompanied the Caliphs or Arabian princes. It is probable, therefore, that many Arabic terms of art were by these means introduced into pharmacy and chemistry, for the origin of which we are indebted to that nation, and which have been still retained and adopted. Hence it may be explained why the first known apothecaries were to be found in the lower part of Italy; but at any rate we have reason to conclude, that they obtained their first legal establishment by the well known medicine edict of the emperor Frederic II, issued for the kingdom of Naples, and from which Thomasius deduces the privileges they enjoy at present.* By that edict it was required that the *confectionarii* should take an oath to keep by them fresh and sufficient drugs, and to make up medicines exactly according to the prescriptions of the physicians; and a price was fixed at which the *stationarii* might vend medicines so prepared, and keep them a year or two for sale in a public shop or store. The physicians at Salerno had the inspection of the *stationes*, which were not to be established in every place, but in certain towns. The *confectionarii* appear to have been those who made up the medicines or *confectiones.* The *statio* was the house where they were sold, or, according to the present mode of expression, the apothecary's shop; and the *stationarii* seem to have been the proprietors, or those who had the care of selling the medicines. The word *apotheca* seldom occurs in that edict; when it does, it signifies the ware-house or repository where the drugs were preserved. I however find no proof in it that the physicians at that time sent their prescriptions to the *stationes* to be made up. It appears rather that the *confectionarii* prepared medicines from a general set of prescriptions legally authorised, and that the physicians selected from these medicines, kept ready for use, such as they thought most proper to be administered to their patients. A physician who had passed an examination, and obtained a licence to practise, was obliged to swear that he would observe *formam curiæ hactenus observatam*; and if he found *quod aliquis confectionarius minus bene conficiat*, he was obliged to give information to the *curia.* The *confectionarii* swore that they would make up *confectiones, secundum prædictam formam.* It was necessary that electuaries, syrups, and other medicines, should be accompanied with a certificate from a physician to show that they were properly prepared. I must acknowledge that the edict alludes here only to some medicines commonly employed; and I am surprised that the recipes are not mentioned, if such were then in use. I have never had the good fortune to meet with the word *Receptum* used to signify a prescription in any works of the above century. The practice of physicians writing out, almost at every visit, the method of preparing the medicines which they order, may perhaps have been introduced at a later period. The book of receipts most in use, by which the medicines of that time were made up, was, according to Dr. Mohsen,* the *Antidotarium*, which the physicians of Salerno caused to be collected and translated into Latin from the works of the Arabian physician Mesues, and from those of Avicenna, Galen, Actuarius, Nicolaus Myrepsius, and Nicolaus Præpositus, by the celebrated professor in that city, Nicolaus di Reggio, a native of Calabria.

---

* Herm. Conringii de hermetica medicina libri duo. Helmstadii 1669, 4to. p. 293.

---

* This edict may be found in *Lindenbrogii Codex legum antiquarum*, Francof. 1613, fol. p. 809, under the title *Constitutiones Neapolitanæ, seu Siculæ*. The law properly here alluded to, *de probabili experientia medicorum*, is by most authors ascribed to the emperor Frederic I, but by Conring to his grandson Frederic II. See *Conring. de antiquitatibus academicis*. Gottingæ 1739, 4to. p. 60.

If it be true that the separation of pharmacy from medicine first took place in Africa, it is highly probable that the well-known Constantinus Afer may have contributed to introduce it also into Italy. This man, who was a native of Carthage, having learned the medical art from the Arabians, made it known in that country, particularly after the year 1086, when he was a Benedictine monk in a monastery situated on Mount Cassino; and the service which he rendered to the celebrated school of physic in the neighbouring city of Salerno, is well known. After his time, the monks in many of the monasteries applied to the preparing of medicines, which they sold to the wealthy, but distributed gratis to the poor, and by these means were much benefited in various respects.

---

* Page 374.

It is well known that almost all political institutions on this side the Alps, and particularly every thing that concerned education, universities, and schools, were copied from Italian models. These were the only patterns then to be found; and the monks, dispatched from the papal court, who were employed in such undertakings, clearly saw that they could lay no better foundation for the Pontiff's power and their own aggrandizement, than by inducing as many states as possible to follow the examples set them in Italy. Medical establishments were formed, therefore, every where at first according to the plan of that at Salerno. Particular places for vending medicines were more necessary, however, in other countries than in Italy. The physicians of that period used no other drugs than those recommended by the ancients; and as these were to be procured only in the Levant, Greece, Arabia, and India, it was necessary to send thither for them. Besides, according to the astrological notions which then prevailed, herbs, to be confided in, could not be gathered but when the sun and planets were in certain constellations, and certificates of their being so were requisite to give them reputation. All this was impossible to be done without a distinct employment, for physicians were otherwise engaged. It was found convenient therefore to suffer some of the principal dealers in drugs gradually to acquire monopolies. The preparation of drugs was becoming always more difficult and expensive. After the invention of distillation, sublimation, and other chemical processes, laboratories, furnaces, and costly apparatus were to be constructed, and it was proper that men who had regularly studied chemistry should alone follow pharmacy; and that they should be indemnified for their expenses by an exclusive trade. These monopolists also could be kept under closer inspection, by which the danger of their selling improper drugs or poison was lessened or entirely removed. It would appear that no suspicions were at first entertained, that apothecaries could amass riches by their employment, so soon and so easily as they do at present; for they were allowed many other advantages, and particularly that of dealing in sweetmeats and confectionary, which were then the greatest delicacies. In many places they were obliged on certain festivals to give presents of such dainties to the magistrates, by way of acknowledgment, and hence probably has arisen the custom of sending new-years gifts of marchepanes and other things of the like kind.

In many places, and particularly in opulent cities, the first apothecaries' shops were established at the public expense, and belonged to the magistrates. A particular garden also was often appropriated to the apothecary, in order that he might rear in it the necessary plants, and which therefore was called the apothecary's garden.* Apothecaries' shops for the use of courts were frequently established and directed by the consorts of princes; and it is a circumstance well known, that many of the fair sex, when they have lost the power of wounding, devote themselves much to the healing and curing art, and to the preparation and dispensing of medicines. Dr. Mohsen says, that the first apothecaries in Germany came from Italy. This may be probable, but I know no proof of it.—I shall now proceed to give some account of the oldest mention made of apothecaries, which will serve to confirm what I have said above.

Of English apothecaries I know nothing more than what Dr. Mohsen has already quoted from Anderson,† who says, that king Edward III, in the year 1345, gave a pension of sixpence a day to Coursus de Gangeland, an apothecary in London, for taking care of and attending his majesty during his illness in Scotland; and this is the first mention of an apothecary in the Fœdera.

Of apothecaries in France no mention occurs before the year 1484; when they received their statutes in the month of August from Charles VIII.* They received others in 1514 under Louis XI; in 1516 and 1520 under Francis I; in 1571 under Charles IX; in 1583 under Henry III; and in 1594 under Henry IV. These regulations were renewed and confirmed by Louis XIII, in the years 1611, 1624, and 1638.†

---

* These gardens in most cities have been revoked, but they still retain their ancient names, though applied to other purposes. In this manner the œconomical garden at Gottingen is called by the common people, the apothecary's garden.

† Geschichte des Handels, ii. p. 365.

For the most copious information respecting German apothecaries, we are indebted to Mr. Sattler. In the beginning of the fifteenth century an apothecary's shop was established at Stutgard by a person named Glatz, which, as the only one in the country, was first sanctioned by the count de Wirtemberg in 1458. In the patent given on that occasion it was said that Glatz's ancestors had, for many years, kept an apothecary's shop at Stutgard, and had furnished it as a proper apothecary ought. In the year 1457, count Ulric gave to Mr. John Kettner, whom the year before he had appointed to be his domestic physician, leave also to establish an apothecary's shop at Stutgard, and promised to allow no other in his dominions. The apothecary received yearly from the count a certain quantity of wine, barley, and rye; but, on the other hand, he engaged to supply the court with as much confectionary as might be necessary, at the rate of twelve schillings per pound.* Both these shops seem afterwards to have been abandoned, and the count and the apothecary to have entertained the same opinion, that each could renounce his contract when he pleased. In the year 1468 one Albrecht Mulsteiner, or Altumsteiner, from Nuremberg, was appointed apothecary, with a promise that no other private or public shop should be tolerated except that at Wirtemberg. The patent is almost like that given to Kettner; but it deserves to be remarked that it contains, in an additional clause, a catalogue of all the different articles, with their prices. An apothecary's shop is mentioned at Tubingen, under count Everhard, as an hereditary fief, the possessor of which bound himself to serve as physician and apothecary to the army in time of war. In the year 1500 duke Ulric of Wirtemberg allowed one Syriax Horn to establish an apothecary's shop at Stutgard, and appointed him his apothecary for six years. He was obliged to swear that he would supply government and all public officers, as well as the duke's subjects, with medicines; and the body physician was enjoined to visit the shop once every year, in order to examine whether Horn conducted himself according to the regulations laid down for him, and sold his medicines at the fixed prices.* In 1559 four apothecaries were appointed in the duchy, viz. at Stutgard, Goppingen, Kalw and Bintigheim, which are still called the land-apothecaries. At the same period there was an apothecary's shop in the ducal palace at Stutgard, which the consort of duke Christopher caused to be furnished at her own expense; and from which the poor received gratis whatever medicines they stood in need of.†

---

* Histoire de Paris, par Sauval, ii. p. 474. Histoire de Paris, par Felibien, ii. p. 927. Traité de la police, par De la Mare, i. p. 618.

† Dictionnaire des arts et metiers, par Joubert, i. p. 105.

---

* Damit wir und die unsern und auch fust menglich, der die bruchen wirdet, versehen sy und die materyen und spetzyen, was das ist, das ein appentecker haben soll, das soll er geben als zymlich und gewonlich ist in andern appentecken am nechsten umb unser land gelegen - - - Er soll uns auch gut gemein confect geben so vil wir bedorfen und zu im niemen werden, und sollen wir im geben fur ein pfundt sollich confect zwolf schilling heller. *Sattlers Geschichte des herzogthums Würtenberg unter den Grafen*, vol. v. p. 159. Addenda, p. 329.

That there were apothecaries' shops at Augsburg so early as the thirteenth and fourteenth centuries, according to the conjecture of Mr. von Stetten, has been mentioned already. By the records of that city it appears that a public shop was kept there by a female apothecary in the year 1445; and at that period a salary was paid by the city to the person who followed that occupation. In 1507 an order was passed that the apothecaries' shops should be from time to time inspected; and in 1512 a price was set upon their medicines, and all others were forbidden to deal in them.‡

---

* Sattlers Geschichte Würtenbergs unter den herzogen, i. p. 59.

† Weissers Nachrichten von den gesetzen des herzogthums Wirtemberg. Stutgard 1781, 8vo. p. 137.

‡ Von Stetten, p. 242.

The antiquity of the first apothecary's shop at Hamburgh, which belonged to the council, cannot be determined; but it is with certainty known that one existed there before the sixteenth century. It was situated in the middle of the city, near the council-house and the exchange, and had a garden belonging to it, in the new town. Before the year 1618 there was at Hamburgh also a private apothecary's shop.* In 1529 a city physician was appointed, and quacks and mountebanks were then banished. The annual visitation by the city physician was established in 1557. The oldest regulation respecting apothecaries is of the year 1586.†

Apothecaries' shops, legally established, existed without doubt at Franckfort on the Mayne before the year 1472; for at that period the magistrates of Constance requested to know what regulations were made there respecting the prices of medicines. In 1489 the city physician was instructed to inspect them carefully, and to see that the proper prices were affixed to the different articles. In 1500 all the apothecaries were obliged to take an oath that they would observe the regulations prescribed for them; and in 1603 a decree was passed that no more apothecaries' shops should be allowed for twelve years than the four then existing; and yet we are told that the fourth was first built in 1629.*

---

* Sammlung der Hamburgischen gesetze und verfassungen. Hamburg 1773, 8vo. xii. p. 28.

† Nucleus recessuum Hamburgens.

In the police regulations drawn up at Basle in the year 1440, by which it was ordered that a public physician should be established in every German imperial city, with the allowance of an ecclesiastical benefice or canonry, in order that he might exercise his art gratis, it is said: "What costly "things people may wish to have from the apo-"thecary's shop they must pay for."† Dr. Mohsen hence concludes that common roots and herbs were not then sold in the apothecaries' shops, but expensive compounds brought from other countries.

The first apothecary's shop at Berlin, of which any certain and authentic account can be found in the king's feudal records, was established in 1488. At that period the magistrates gave one Hans Zehender a right to the hereditary possession of a shop, and promised to allow him yearly, to enable him to support it, a certain quantity of rye, with a free house, and engaged also to exempt him from all contributions, watching, and other public burthens, and to permit no other apothecary to reside in the city. This agreement was confirmed in 1491 by the elector John; and in 1499 the elector Joachim I, on his coming to the government, gave the apothecary a new patent, in which his body physician was charged to take care that the shop should be furnished with proper drugs, that the medicines for the elector and his court should be made up according to the prescriptions; and that they should not be charged too high, contrary to the regulated prices.* In the year 1573 there was an apothecary's shop in the palace for the use of the court; but Mr. Nicolai † conjectures that it was only a portable one, and consisted of some chests filled with medicines. The present one was founded in 1598 by Catharine consort of the elector Joachim Frederick; ‡ but the establishment, as it now stands, began to be formed in the year 1605, when Crispin Haubenschmid, the first apothecary to the court, was brought from Halle to Berlin. Catharine, widow of the margrave John of Custrin, caused an apothecary's shop for the use of the court to be established at Krossen, under the inspection of her physician Wigands, because there was then no shop of that kind in the place; and at her death in 1574 she bequeathed it to the magistrates.§

---

* Von Lersner's Frankfurter Chronik, i. p. 26, 493, and ii. p. 57, 58.

† Goldasti Constitutiones Imperiales. Francof. 1607. fol. p. 192.

In Halle there was no apothecary's shop till the year 1493. Before that period medicines were sold only by grocers and barbers. In the above year however the council, with the approbation of the archbishop, permitted one Simon Puster to establish an apothecary's shop, in order, as stated in the patent, that the citizens might be supplied with confections, cooling liquors, and such like common things, at a cheap rate; and that, in cases of sickness, they might be able to procure readily fresh and well-prepared medicines. Puster was exempted by it from all taxes and contributions for ten years, but with this proviso, that during that period he should furnish yearly, at the council-house, for two collations in the time of the festivals, eight pounds of good sugar confections, fit and proper to be used at such entertainments. It stated, on the other hand, that in future no kind of preserves made with sugar, or what was called confectionary, or theriac, should be kept for sale or sold either in the market or in booths, shops or stalls, except at the annual fair. This apothecary's shop was the only one in Halle till the year 1535, when the archbishop gave his physician, J. N. von Wyhe, liberty to establish a new one; but with an assurance that, to eternity, no more apothecaries' shops should be permitted in Halle; and this declaration was confirmed by the chapter. Notwithstanding the archbishop's promise, strengthened by that of his clergy, one Wolf Holzwirth, a skilful apothecary, who returned from Italy, found means to procure permission in 1555 to establish a third apothecary's shop.[*]

---

* Mohsens Geschichte, p. 379, where may be found a copy of the letter-patent of 1491; and p. 530, where the later history of the Berlin apothecaries is given.

† Beschreibung von Berlin. Third edition, i. p. 39 and 87.

‡ Hallens Werkstate der künste, v. p. 399.

§ Mohsen, p. 555.

In the year 1409, when the university of Prague was transferred to Leipsic, and every thing at the latter was put on the same footing as at the former, an apothecary's shop was also established, which, as that at Prague had been, was known by the sign of the Golden Lion.

In the year 1560 there was no apothecary's shop at Eisenach, and even in the time of duke John Ernest, who died in 1638, there was none for the court; but the place of apothecary was supplied by one of the yeomen of the jewellery.[†]

In the year 1598, count John von Oldenburg caused an apothecary's shop to be established at Oldenburg for the common good of the country.[‡]

In Hanover the first apothecary's shop was established by the council in 1565, near the council-house.[§] The consort of duke Philip II of Grubenhagen, a princess of Brunswick, who was married in 1560, supported at her court an apothecary's shop and a still-house, for the benefit of her servants and the poor.* Duke Julius, who came to the government of Brunswick in 1568, caused apothecaries' shops to be established in his territories; and his consort, a daughter of the elector of Brandenburg, kept, for the use of the poor, an expensive apothecary's shop in her palace; and the citizens of the new Heinrichstadt, near Wolfenbuttel, were allowed, when afflicted by any epidemical disease, the dysentery, quinsy, scurvy, or stone, to be supplied with medicines from it free of all expense.†

---

[*] Von Dreyhaupts Beschreibung des Saal-Creyses, ii. p. 561.

[†] I cannot remember where I obtained this information. I imagined that I had read it in *Schumachers Nachrichten zur erläuterung der Sächsischen und Eisenachen geschichte*, 1776; but on turning over that work I was not able to find it.

[‡] Hamelmanns Oldenburgische Chronik, 1599, fol. p. 491.

[§] Grupens Origines Hannoverenses. Gottingen 1740, 4to. p. 341.

The apothecary's shop at the court of Dresden was founded by the electress Ann, a Danish princess, in the year 1581. In 1609 it was renewed by Hedwig, widow of the elector Christian I; and in 1718 it received considerable improvement.*

---

* "By her apothecary's shop and still-house one may discover what real compassion the Christian-like electress showed towards the poor who were sick or infirm; for, by having medicines prepared, and by causing all kinds of waters to be distilled, she did not mean to assist only her own people and those belonging to her court, but the poor in general, whether natives or foreigners, and not for the sake of advantage or gain, but gratis and for the love of God." *Letzners Dasselsche und Eimbecksche chronica.* Erfurt 1596, fol. p. 104.

† This account is taken from the learned information collected by professor Spittler, in his *Geschichte der fürstenthums Hannover.* Gottingen 1786, 8vo. p. 275. That the council of Gottingen began very early to pay great attention to medical institutions, is proved by the following passage from the *Gottingischen Chronike* of Franciscus Lubecus: "Anno 1380, the city procured a surgeon "from Eschwege, who with his servant was to be exempted from "contributions and watching; and to receive clothes yearly from "the council." See *Beschreibung der stadt Gottingen.* Gotting. 1734, 4to. i. p. 100.

Gustavus Erickson, king of Sweden, was the first person in that country who attempted to establish an apothecary's shop. On the 20th of March 1547, he requested Dr. John Audelius of Lubec to send him an experienced physician and a good apothecary. On the 5th of May, 1550, his body-physician, Henry von Diest, received orders to bring a skilful apothecary into the kingdom. When the king died in 1560, he had no other physicians with him than his barber master Jacob, an apothecary master Lucas, and his confessor Magister Johannes, who, according to the popish mode, practised physic, and prescribed for his majesty. Master Lucas, as appears, was the first apothecary at Stockholm. On the 21st of March 1575, one Anthony Busenius was appointed by king John apothecary to the court; † and in 1623 Philip Magnus Schmidt, a native of Langensalza in Thuringia, was chosen to fill that office. In the year 1675 there were five apothecaries' shops in Stockholm: since 1694 the number has been nine. The first apothecary's shop at Upsal was established in 1648 by Simon Wolimhaus, who came from Konigsee in Thuringia, and from whom the present family of count Gyllenborg are descended. The first apothecary's shop at Gottenburg was established about the same time.* Towards the end of the sixteenth century physicians and apothecaries were invited into Russia by the czar Boris Godunow.†

---

* (Anton. Weekens) Beschreibung und vorstellung der residenz Dresden, 1680. fol. p. 69. Weinarts Topographische geschichte der stadt Dresden. Dresden 1777, 4to. p. 304.

† Von Dalins Geschichte des reiches Schweden, übersetzt von Dahnert. Rostock und Greifswald 1756—1763, 4 vol. 4to. iii. p. 318 and 394.

I shall here take occasion to remark the following circumstance: At the Byzantine court the keeper of the wardrobe, as the yeoman of the jewellery at Eisenach in the sixteenth century, had the care of the portable apothecary's shop when the emperor took the field. It was called *pandectæ*, and contained theriac and antidotes, with all kinds of oils, plasters, salves and herbs proper for curing men and cattle.‡

---

* This information may be found in *Inträdes-tal om Stockholm för 200 ar sen, och Stockholm nu förtiden, i anseende til handel och vetenskaper, särdeles den medicinska, hallit* 1758 af Pet. Jon. Bergius, 8vo. This discourse contains so valuable an account of the history of medicine in Sweden, and the history of literature in general, that a good translation of it would deserve thanks.

† Essai sur la bibliotheque à St. Petersbourg, par J. Backmeister, 1776, 8vo. p. 37.

‡ Constantinus Porphyrogen. de ceremoniis aulæ Byzantinæ. Lipsiæ 1751, fol. i. p. 270. The βασιλικον βεστιαριον ought to contain θηριακην, ἡνιτζιν, ἕτερα αντιφαρμακα σκευαστα και μονοειδη, δια τους φαρμακευομενους· πανδεκτα μετα παντοιων ελαιων και βοηθηματων, και παντοιων εμπλαστρων και αλοιφων και αλημματων και λοιπων ιατρικων ειδων, βοτανων και λοιπων των εις θεραπειαν ανθρωπων και κτηνων τυγχανοντων. Fert quoque vestiarium

I must add a few observations also respecting the earliest *Dispensatorium.* It is almost generally admitted that the first was drawn up by Valerius Cordus, or at least that his was the first sanctioned by the approbation of public magistrates. Haller has remarked one older; but it is now known only from the title mentioned by Maittaire. * Cordus however appears to have first used the word *dispensatorium* for a collection of receipts, containing directions how to prepare the medicines most in use. This book, it is well known, has been often printed with the additions of other physicians; but, in my opinion, Conring † is in a mistake when he says that it was improved and enlarged by Matthiolus. I have in no edition found any additions of Matthiolus; and the error seems to have arisen from the christian name of Matthias Lobelius, which stands in the title of

---

theriacam, enitzin, aliaque antipharmaca composita et simplicia, pro iis qui forte venenum hauserint: pandectas porro (seu apothecas universales) refertas omnis generis oleis et remediis et emplastris, et illitibus et unguentis aliisque speciebus medicis, ut herbis et aliis, quæ sanandis hominibus bestiisque conducunt.—What ηνιτζιν was I do not know. Reiske has left it unexplained.

* Bibliotheca botan. i. p. 244. Ricettario di dottori dell' arte e di medicina del collegio Fiorentino, all' instantia delli Signori Consoli della università delli speciali. Firenz. 1498, fol. Maittaire. Primum, quantum repperi, dispensarium.

† Conringii Introductio in artem medicam. Helmstadii 1687. 4to. p. 375: Idem deinde etiam emendaverunt atque auxerunt Matthiolus et Lobelius.

some editions, because his annotations are added to them. It is very singular that Kestner* also has fallen into this mistake, who, however, says that the name of Matthiolus is only in the title, for in the book itself he found no appearance of his having had any concern with it.

QUARANTINE.

Of all the means by which in modern times the infection of that dangerous malady, the plague, has been so much guarded against, that according to general opinion, unless the Deity render all precaution useless, it can never again become common in Europe, the most excellent and the most effectual is, without doubt, the establishment of quarantine. Had not history been more employed in transmitting to posterity the crimes of princes, and particularly the greatest of them, destructive wars, than in recording the introduction of such institutions as contribute to the convenience, peace, health, and happiness of mankind, the origin of this beneficial regulation would be less obscure than it is at present. At any rate, I have never yet been so fortunate as to obtain a satisfactory account of it; but though I am well aware that I am neither acquainted with all the sources from which it is to be drawn, nor have examined all those which are known to me, I will venture to lay before my readers what information I have been able to collect on the subject, assuring them at the same time, that it will afford me great pleasure if my attempt should induce others fond of historical research to enlarge it.

---

* C. G. Kestneri Bibliotheca medica, Jenæ 1746, 8vo. p. 638: Matthioli vero annotationes in rubro quidem promittuntur, nihil vero earum in nigro invenitur. In professor Böhmers *Handbuch der naturgeschichte* Matthioli et Lobelii scholia et emendationes occur, i. 2. p. 304.

The opinion that the plague was brought to Europe from the East, is, as far as I am able to judge, so fully confirmed, that it cannot be any longer doubted; though it is certainly true, that every nation endeavours to trace the origin of infectious disorders to other people. The Turks think that the plague came to them from Egypt; the inhabitants of that country imagine that they received it from Ethiopia; and, were not our geography deficient respecting the latter, we should perhaps know that the Ethiopians do not believe that this dreadful scourge originated among them.*

---

* The oldest plague of which we find any account in history, that so fully described by Thucydides, book ii. was expressly said to have come from Egypt. Evagrius in his *Histor. ecclesiast.* iv. 29, and Procopius *de Bello Persico,* ii. 22, affirm also that the dreadful plague in the time of the emperor Justinian was likewise brought from Egypt. It is worthy of remark, that on both these occasions, the plague was traced even still further than Egypt; for Thucydides and the writers above quoted say that the infection first broke out in

As the plague however has always been conveyed to us from the East, and has first, and most frequently, broken out in those parts of Europe which approach nearest to the Levant, both in their physical and political situation, those I mean which border on Turkey, and carry on with it the most extensive trade, we may with the more probability conjecture that these countries first established quarantine, the most powerful means of preventing that evil. If further search be made in regard to this idea, we shall be inclined to ascribe that service to the Venetians, a people who, when the plague began to be less common, not only carried on the greatest trade in the Levant, but had the misfortune to become always nearer neighbours to the victorious Turks. It is also probable, that the Hungarians and Transylvanians soon followed their example in this approved precaution, as the Turks continued to approach them; and this agrees perfectly with every thing I have read in history.

Brownrigg, an Englishman, who wrote a book on the means of preventing the plague,* says, that quarantine was first established by the Venetians in the year 1484. As I have not had an opportu-

---

Ethiopia, and spread thence into Egypt and other countries. See Mr. Dohms appendix to *Ives Reisen nach Indien und Persien.* Leipsic 1775, 8vo. ii. p. 462.

* Considerations on the means of preventing the communication of pestilential contagion, by William Brownrigg. London 1771. See *Gottingische gelehrte anzeigen* 1772, p. 22.

nity of seeing that work, I do not know by what authorities the author supports his assertion. Perhaps he has no other voucher than his learned countryman Mead, who assigns the same year, without adducing any proofs.* I imagined that I should find some more certain information respecting this point in Le Bret's History of the Republic of Venice: but as that historian does not mention, as the title professes, the original sources from which he derived his materials, his work is less worthy of credit. He tells us however that the grand council, in 1348, chose three prudent persons, whom they ordered to investigate the best means for preserving health, and to lay the result of their inquiry before the council.† The plague which broke out afterwards in 1478, rendered it necessary that some permanent means should be thought of, and on that account a peculiar magistracy consisting of three noblemen, with the title of *sopra la sanità*, was instituted in 1485. As these were not able to stop the progress of the disease, the painful office was imposed upon them, in 1504, of imprisoning people against whom complaints might be lodged, and even of putting them to death; and in 1585 it was declared, that from the sentence of these judges there should be no appeal. Their principal business was to inspect the lazarettos erected in certain places at some distance from the city, and in which it was required that all persons and merchandize coming from suspected parts should continue a stated time fixed by the laws. The captain of every ship was obliged also to show there the bill of health which he had brought along with him.

---

* *De Peste*, in Mead's *Opera Medica*. Gottingæ 1748, ii. p. 40: Venetiis custodiæ imponi solitæ sunt inde ab anno 1484, quo primum tempore, ut ex historiarum monumentis colligere est, in Europa hæc consuetudo cœpit.

† Geschichte von Venedig. Riga 1775, 4to. part ii. divis. 2. p. 752.

As Le Bret produces no proof that quarantine was established by the Venetians so early as he says, I cannot help suspecting that he is mistaken respecting the year (1348), and conjecture that it ought to be 1448, or perhaps 1484. I have not been able however to resolve my doubt; for, in examining different Italian writers, I find that various years are given.[*] The institution of the council of health (*sopra la sanità*) is mentioned by Bembo; but I cannot discover from him to what year he alludes.[†] His countryman Lancellotti, who undoubtedly must have understood him well, makes it to be 1491.[*] Caspar Cantarenus, who died in 1542, in the sixtieth year of his age, mentions no particular period, and only says that the institution had been formed not long before his time.[†] The islands on which the pest-houses were erected, were called *il Lazàretto vecchio*, and *il Lazaretto nuovo*. In the elegant description of Venice, ornamented with abundance of plates, below mentioned, it is remarked that the pest-house on the former island was built in 1423, and that on the latter in 1468.[‡] The same account is given in the newest and best Topography of Venice.[§] I can add nothing further on this subject

---

[*] Every thing said by Le Bret on this subject may be found equally full in *Saggio sulla storia civile, politica, ecclesiastica, e sulla corografia e topografia degli stati della republica di Venezia*; dell' abate D. Christoforo Tentori. In Venezia 1786, 8vo. tomo vi. p. 391. As Vettore Sandi in *Principi di storia civile della republica di Venezia*, published from 1755 to 1769, in nine quarto volumes, gives the same account, lib. viii. cap. 8. art. 4, they must have both got their information from the same source.

[†] Il seguente anno, percioche nella città il morbo havea comminciato a farsi sentire, creò la Republica un magistrato di tre signori sopra la sanità; il qual magistrato sempre dapoi continuò a crearsi di tempo in tempo. *Della historia Vinitiana, di M. Pietro Bembo,*

---

card. volgarmente scritta, libri xii. In Vinegia 1552, 4to. lib. i. p. 10. A Latin translation of this history may be found in *Thesaurus antiquitatum et histor. Italiæ*, v. 1. p. 15.

[*] L'Hoggidi, overo il mondo non peggiore, ne più calamitoso del passato. In Venetia 1627, 8vo. p. 610.

[†] Hoc præfectorum genus non multo ante nostram tempestatem institutum fuit; cum quidem antea creberrime urbs pestilentia laboraret. - - - - - Sed postquam novo huic magistratui hæc cura demandata est, nulla pene pestilentia fuit. *De Republica Venetorum*, lib. iv, in *Thesaurus antiquitat. Italiæ*, v. 1. p. 50.

[‡] Thesaurus antiquitatum Italiæ, v. 2. p. 241.

[§] Il Lazaretto vecchio, isola, l'anno 1422 fu dal Senato giudicata opportuna ad accogliere le persone e le merci che venivano da' paesi marittimi, onde colà restassera finchè fossero giudicate non infette di peste, o d'altro mal contagioso. - - - - Furono in quest' isola eretti de' publici alberghi a questo fine, ed allora si chiamò quest' isola col nome di Lazzaretto. E'poco discosta dall' isola di S. Lazzaro, dalla quale ne' giorni festivi passa un di que' monaci a celebrare la messa nella chiesa che vi fu decentemente fabbricata. Questi alberghi

except what is said by Brownrigg, who affirms that letters of health, in which he confides more than in quarantine, were first written in 1665 by the consuls of the different commercial nations.* Why the space of forty days was chosen as a proof I do not know. It appears, however, that this period was not fixed from medical observations, as has already been remarked by Chenot.† As pro-

---

furono in più ampia forma ristaurati nel 1565. Chiamasi poi Lazzaretto vecchio, perchè nel 1467 ne fu eretto un altro, che fu chiamato Nuovo, in una altra isola; onde non mancasse mai albergo a chi veniva dal mare con sospetto di contagiosa malattia. *Topografia Veneta, overo Descrizione dello stato Veneto.* Venezia 1786, 8vo. iv. p. 263. In Busching's Geography both these islands are omitted, but they are noticed in Hubner's Geography, Dresden and Leipsic 1761, i. p. 761. In the latter, however, for the year 1648, which is an egregious error, must be substituted 1468. I have in my possession an old map of the Venetian States, which I can no otherways describe than by saying, that in the middle of it stands the name *Bertelli.* In this map both the islands are delineated.

* Gottingische gelehrte anzeigen 1782, p. 22.

† Utut vero hoc institutum insigni sane sese distinxerit emolumento, eique integræ provinciæ et regna suam a peste immunitatem sæpe acceptam retulerint et adhuc dum referant, frequens tamen meditatio mihi rationem nondum suggessit, cur exantlanda in lazaretis mora numero quadraginta dierum adstricta fuerit. Sive enim pestis decursum, sive miasmatis indolem considero, nihil invenio quod satisfaciat. An forte observationes legi causam dederunt? Asserere aut negare non possum, qui paucos auctores de peste legi. Interim sequentes potius innuunt miasma pestiferum, quando ex uno loco in alium transportatur, intra multo breviorem moram in actum deduci. - - - Circa nullum morbum veræ fidæque observationes magis desunt, quam circa pestem. *Tractatus de Peste.* Vindobonæ 1766, 8vo. p. 196.

per experiments had not been made to ascertain how long the infection might lie dormant, it was perhaps chosen merely from some superstitious notions, because people were accustomed to it in Lent.

PAPER-HANGINGS.

THREE kinds of paper-hangings have for some time past been much used on account of their beautiful appearance and their moderate price. The first and plainest is that which has on it figures printed or drawn either with one or more colours, and which consists only of painted paper. The second sort contains figures covered with some woolly stuff pasted over them: and the third, instead of woolly stuff, is ornamented with a substance that has the glittering brightness of gold and silver. It appears that the idea of covering walls with parti-coloured paper might have readily occurred, but the fear of such hangings being liable to speedy decay may have prevented the experiment from being made. In my opinion the simplest kind was invented after the more ingenious, that is to say, when the woolly or velvet kind was already in use.* The preparation of them has a great affinity to the printing of cotton. Wooden blocks of the like kind are employed for both; plates of copper are also used; and sometimes they are painted after patterns. Artists possess the talent of giving them such a resemblance to striped and flowered silks and cottons, that one is apt to be deceived by them on the first view. Among the most elegant hangings of this kind, may be reckoned those which imitate so exactly every variety of marble, porphyry, and other species of stones, that when the walls of an apartment are neatly covered with them, the best connoisseur may not without close examination be able to discover the deception. That the resemblance may be still greater, a hall may be divided by an architect into different compartments by pillars, so as to have the appearance of a grand piece of regular architecture. Whether Mr. Breitkopf at Leipsic was the inventor of this kind of hangings, I do not know, but it is certain that he has brought it to great perfection.†

---

* The simplest or worst articles are not always the oldest or the first. The deterioration of a commodity is often the continuation of an invention, which, when once begun, is by industry carried backwards and forwards, in order that new gain may be acquired from each variation. The earliest printers, for example, had not the art of printing with so slight ink and on so bad paper as ours employ. And Aldus, perhaps, were he now alive, would wonder as much at the cheap mode of printing some of our most useful books, such as Busching's Geography, as he would at a Baskerville's Horace.

† See my Beytrage zur ökonomie, technologie, &c. vol. iii. p. 470.

The second kind, or, as it is called, velvet-paper, is first printed like the former, but the figures are afterwards wholly, or in part, covered with a kind of glue, over which is strewed some woolly substance, reduced almost to dust, so that by these means they acquire the appearance of velvet or plush. The ground and the rest of the figures are left plain; but the whole process is so complex that it is impossible to convey a proper idea of it by a short description. The shearings of fine white cloth, which the artist procures from a cloth-manufactory, and dyes to suit his work, are employed for this purpose. If they are not fine enough, he renders them more delicate by making them pass through a close hair sieve.* This, as well as the third kind, was formerly made much more than at present upon canvass; and, in my opinion, the earliest attempts towards this art were tried not upon paper but on linen cloth. The paper procured at first for these experiments was probably too weak; and it was not till a later period that means were found out to strengthen it, and stiffen it by size and paste.

The invention of velvet-paper is, by several

---

* A full and technical description of the method of manufacturing these paper-hangings may be found in *Hartwig's Handwerke und Künste*, xv. p. 5; *Jacobson's Schauplatz der zeugmanufacturen*, i. p. 296, and in the *Encyclopédie*, xv. p. 898, first edition, from which it has been copied into *Savary's Dictionnaire de commerce*. The French names for these hangings are *papiers veloutés*, or *papiers soufflés*; *tapisserie en laine hachée*; *tapisserie de tenture de laine*.

French writers,* ascribed to the English; and, if they are not mistaken, it was first made known in the reign of Charles I. On the 1st of May 1634, an artist, named Jerome Lanyer, received a patent for this art, in which it is said that he had found out a method of affixing wool, silk, and other materials of various colours upon linen cloth, silk, cotton, leather, and different substances with oil, size, and cements, so that they could be employed for hangings as well as for other purposes.† The inventor wished to give to this new article the name of Londrindiana, which appears however not to have continued in use. It is worthy of remark, that this artist first made attempts to affix silk upon some ground, but that method as far as I know was not brought to perfection; that he employed for the ground linen and cotton cloth, or leather; and that no mention

---

* Origny, in Dictionnaire des origines, v. p. 332. Journal œconomique, 1755, Mars, p. 86. Savary, Dictionnaire de commerce, iv. p. 903.

† I shall here insert the words of the patent: "To all those to whom these presents shall come, greeting. Whereas our trusty and well-beloved subject and servant Jerome Lanyer hath informed us, that he by his endeavours hath found out an art and mystery by affixing of wool, silk, and other materials of divers colours upon linen cloth, silk, cotton, leather, and other substances, with oil, size, and other cements, to make them useful and serviceable for hangings and other occasions, which he calleth Londrindiana, and that the said art is of his own invention, not formerly used by any other within this realm, &c." - - - *Fœdera*, tom. xix. London 1732, fol. p. 554. In the German translation of *Anderson's History of Commerce*, v. p. 137, the word *size* is translated *wax*, probably because the dictionaries translate *to size* by the expressions *to wax, to cover over with wax*. But size among gilders and those employed in lackering is the ground upon which they lay gold and silver leaf, in order that it may adhere.—The following observations may serve to illustrate all works of this nature in general. Painting, according to the most common technical meaning, may be divided into three kinds. In the first the colours or pigments are mixed with a viscous or glutinous fluid to bind them, and make them adhere to the body which is to be painted. Gums, glue, varnish, &c. may be used for this

purpose. Vegetable colours will not admit of such additions, because they contain gum in their natural composition. Another kind consists in previously washing over the parts that are to be painted with some viscous substance, and then laying on the colours as the figures may require. Size, or cement (I use the word in the most extensive sense), is of such a nature that either in drying or glazing it becomes hard, and binds the colours. To this method belongs not only gilding, imitating bronze, and making velvet-paper-hangings, but also painting on glass and in enamel. By the third method, the colours are applied to the ground without any binding substance: they are therefore more liable to decay, as is the case in painting with crayons; but they will however adhere better when the pigments consist of very fine particles like ceruse, or black-lead. It would be a great acquisition if a substance could be found out to bind the colours used in this art without injuring them, or to fix the crayons. The third kind of painting is not with colours, but with different bodies ready coloured, which are joined together in pieces according to a copy, either by cement or plaster, as in mosaic, or by working them into each other, as in weaving and sewing, which is painting with the needle. - - - - Are not the works of art almost like those of nature, each connected together as a chain? Do not the boundaries of one art approach those of another? Do they not even touch each other? Those who do not perceive this approximation are like people unacquainted with botany, who cannot remark the natural order of plants. But if a connoisseur observe a gap in the chain of artificial works, we are to suppose that some links are still wanting, the discovery of which may become a merit to more ingenious ages.

is made of his having used paper, though he seems not to have confined himself entirely to leather or cloth.

Tierce, a Frenchman, has however disputed this invention with the English; for he asserts that one of his countrymen at Rouen, named François, made such kinds of printed paper-hangings so early as the year 1620 and 1630, and supports his assertion by the patterns and wooden blocks which are still preserved, with the above-mentioned years inscribed on them.* He is also of opinion, that some Frenchmen, who fled to England, when persecuted for their religion, carried this art along with them. The inventor's son followed this business to a great extent for more than fifty years at Rouen, and died in 1748. Some of his workmen went privately to the Netherlands and Germany, where they sold their art; and the French, therefore, with great confidence maintain, without knowing our artists and their works, that foreigners in this branch of manufacture are still far behind them. In most works of the kind, my countrymen indeed are only imitators, not through want of talents to invent or to improve, but because our great people, for whom they must labour, consider nothing as fashionable or beautiful, except what has been first made by the French or the English.

I shall here observe, that Nemeitz ascribes the invention of wax-cloth-hangings, with wool chopped and beat very fine (these are his own words), to a Frenchman named Audran, who in the beginning of the last century was an excellent painter in arabesque and grotesque figures, and inspector of the palace of Luxemburg at Paris, in which he had a manufactory for hangings of that kind.* What particular service he rendered to the art of making paper-hangings, I have not however been able to learn. Equally uncertain and defective is the information of Mr. von Heinecken,† that one Eccard invented the art of imprinting on paper-hangings gold and silver figures, and carried on a manufactory for such works.

---

* Journal œconomique, 1756, Fevrier, p. 92.

In regard to the time when these hangings began to be made in Germany, I can only say, that the oldest information I know respecting them is to be found in a work‡ by Andrew Glorez von Mahren, printed for the first time in 1670. It shows that the art was then very imperfect as well as little known, and that it was practised only by women upon linen for making various small articles.*

---

* Both his brothers, John and Benedict Audran, were celebrated engravers. See *Nemeitz, Sejour de Paris,* Francfort 1728, 8vo, p. 314 and 306.

† Nachrichten von künstlern und kunstsachen. Leipzig 1768, 8vo. ii. p. 56. The author, giving an account of his travels through the Netherlands, says, "Before I leave the Hague I must not omit to mention Mr. Eccard's particular invention for making paper-hangings. He prints some which appear as if worked through with gold and silver. They are fabricated with much taste, and are not dear.

‡ Haus- und land-bibliothek des Andreas Glorez von Mahren, iii. p. 90.

One of the most ingenious new improvements in the art of manufacturing these hangings, consists in bestrewing them here and there with a glittering metallic dust or sand, by which they acquire a resemblance to rich gold and silver brocade. From the above-quoted work it appears, that artists began very early to cover some parts of paper-hangings with silver-dross, or gold-foil; but as real gold was too dear to be used for that purpose, and as imitations of it soon decayed, this method seems not to have been long continued. Instead of these, Nuremberg metallic dust, as well as silver-coloured foil, are employed. Metallic dust is the invention of an artist at Nuremberg, named John Hautsch, who constructed also a carriage which could be moved by the person who sat in it. He was born in the year 1595, and died in 1670.* His descendants have continued to the present time the preparation of the metallic dust, which is exported in large quantities from Nuremberg, and is used in shell-work, lackered-ware, and for various other purposes. It is prepared by sifting the filings of different metals, washing them in a strong lye, and then placing them on a plate of iron or copper over a strong fire, where they are continually stirred till their colour is altered. Those of tin acquire by this process every shade of gold-colour, with a metallic lustre; those of copper the different shades of red and flame-colour; those of iron and steel become of a blue or violet; and those of tin and bismuth appear of a white or blueish white colour. The dust, tinged in this manner, is afterwards put through a flatting-mill, which consists of two rollers of the hardest steel, like those used by gold and silver wire-drawers, but for the greater convenience a funnel is placed over them.* I have in my possession samples of all the above kinds, which have an exceedingly beautiful appearance. This metallic dust is affixed so strongly to paper, by means of a cement, that it is almost impossible to detach it without tearing the paper, as is the case with the paper-hangings procured from Achen. In French, such paper is called *papiers avec paillettes.* The lustre of it is so durable that it continues unaltered even on the walls of sitting-apartments. The metallic dust however has a considerable weight, which may undoubtedly injure the paper.

---

* The author says: I shall give an account of a beautiful art, by which one may cover chairs, screens, and other articles of the like kind, with a substance of various colours made of wool, cut or chopped very fine, and cleaned by being made to pass through a hair sieve - - - - - I remember that two Swabian women travelled about through some countries, and taught people this art, by which means they gained a good deal of money.—The edition of this work in the library of our university has in the title page, *Regensburg, zu Statt am Hof*, 1701; but there is besides a printed slip of paper, pasted on, with the following words: *Nurnberg, zu finden bey Joh. Christ. Lochner*. No year is mentioned. The edition of Regensburg, 1670, fol. is quoted by Munchausen in his *Hausvater*, ii. p. 10, 46. See Haller's *Biblioth. botan.* i. p. 551, and *Bœhmeri Bibliotheca scriptorum hist. nat.* i. 2. p. 610; where the name, however, is erroneously printed *Glorenze*. A larger volume was afterwards added with the title; *Continuation der Haus- und land-bibliothek*, in four parts. Nurnberg, fol. (properly Regensburg, 1701). Of the author I have been able to procure no information. His book is a compilation selected without any taste, and according to the ideas of the 17th century, from different writers, almost always without mentioning the sources from which the articles are taken; but it deserves a place in public libraries, because it contains here and there some things which may help to illustrate the history of agriculture and the arts.

---

* Doppelmayr von Nürnbergischen Künstlern, p. 301.

This inconvenience may have induced artists to employ, instead of metallic dust, that silver-coloured glimmer, known under the name of cat-silver, which has been long used in the like manner. So early as the 17th century, the miners at Reichenstein, in Silesia, collected and sold for that purpose various kinds of glimmer, even the black, which acquires a gold-colour by being exposed to a strong heat.† The nuns of Reichenstein ornamented with it the images which they made, as the nuns in France and other catholic countries ornamented their *agni Dei*, by strewing over them a shining kind of talc.* The silver-coloured glimmer however has not such a bright metallic lustre as metallic dust, but it nevertheless has a pleasing effect when strewed upon a white painted ground, and its light thin spangles or scales retain their brightness and adhere to the paper as long as it lasts. At present I am acquainted with no printed information respecting the method of laying on metallic dust and glimmer, nor do I know where artists procure the latter, which in many countries is indeed not scarce. I shall here observe, that I once saw at Petersburg a kind of Chinese paper, which appeared all over to have a silver-coloured lustre without being covered with any metallic substance, and which was exceedingly soft and pliable. It bore a great resemblance to paper which has been rubbed over with dry sedative salt or acid of borax. I conjecture that its surface was covered with a soft kind of talc, pounded extremely fine; but as I have none of it in my possession at present, I can give no further account of it.

---

* Kunkels Glasmacher-Kunst. Nurnberg, 1743, 4to. p. 368, and 377. Joh. Jakob Marxens Neu vermehrte Materialkammer.

† Volkmann, Silesia subterranea. Leipzig 1720, 4to. p. 52.

---

* Pomet, Materialist und specereyhandler. Leipzig 1717, fol. p. 826.

KERMES. COCHINEAL.

Though a variety of information respecting the history of cochineal or kermes may be found scattered in the works of different authors, I shall venture to lay before the public what I have remarked on the subject: as I flatter myself with the hope of being able to rectify some errors of my predecessors, as well as to supply deficiencies which they have left; and as it will undoubtedly be agreeable to many readers to see collected in one point of view whatever is most important, with the addition of a few explanatory observations and notes.

Cochineal and kermes, as they appear in commerce, are small grains, shaped almost like those small dried grapes without stones, which are called corinths. They are sometimes of a deep, and sometimes of a fainter reddish-brown, or violet-brown colour, are often covered with a gray dust or mouldiness, appear full of wrinkles, as succulent bodies generally do when dried, and for the most part are a little more raised on the one side than on the other. When these grains are chewed, they have a somewhat bitterish and astringent taste, and communicate to the spittle a brownish-red colour. They are employed in medicine, but their principal use is in dyeing.

It is now well known that they belong to that genus of insects called *coccus*, and that they are principally the dried females or the impregnated ovaria of different kinds. Entomologists have not yet supplied us with characteristics so precise as to enable us to distinguish the numerous species of these insects; they have contented themselves with giving them names according to the plants on which they are found; but for my purpose it will be sufficient to take notice of only three kinds, with a few of their variations.

The first is the real American cochineal, or that which at present is most used, but which at the same time is the dearest. By Linnæus it is called *coccus cacti*. The second kind is found chiefly on a species of oak, the *quercus ilex*, in the Levant, Spain, France, and other southern countries, and is therefore called *coccus ilicis*, *coccus arborum*, and often also kermes. The third comprehends that saleable cochineal found on the roots of several perennial plants, which is known commonly under the appellation of Polish or German cochineal; though it is not certain whether those insects produced upon the perennial knawel (*scleranthus*), bears-breech (*uva-ursi*) and other plants, be the same species. They are often distinguished also by the name of *coccus radicum*.

That the second species has been mentioned by the ancient Hebrew, Greek, Latin, and Arabian writers cannot be denied; and to those who know that our information respecting the nature of this commodity, which is perhaps even yet imperfect, has been in modern times procured after much labour and research, will not be surprised to find their accounts mingled with many falsehoods and contradictions. The ancients must have been under more doubt and in greater ignorance on this subject, the less they were acquainted with the propagation of these insects; but we should be too precipitate were we to reject entirely every thing they have said that may deviate from the truth; and I think it would be no difficult task to produce writers of the 17th and of the 18th century, whose information on this point is as dubious and incorrect as that to be found in the writings of the ancients.

All the ancient Greek* and Latin writers agree that kermes, called by the latter *coccum*, perhaps also *coccus*, and often *granum*, were found upon a low shrubby tree, with prickly leaves, which produced acorns, and belonged to the genus of the oak; and there is no reason to doubt that they mean *coccum ilicis*, and that low ever-green oak, with the prickly leaves of the holly (*aquifolium*), which is called at present in botany *quercus ilex*. This assertion appears more entitled to credit, as the ancients assign for the native country of this tree places where it is still indigenous, and produces kermes.

---

* By Dioscorides they are called κοκκος βαφικη. Dioscorides, iv. 48. p. 260. Respecting the tree, Pausanias, lib. x. p. 890, seems to raise some difficulty, as he compares it to the σχινος, lentiscus, or, as others read the word, σχοινος. But it has been remarked long ago, that the reading ought to be πρινος, ilex; and this alteration is supported by some manuscripts.

According to the account of Dioscorides, kermes were collected in Galatia, Armenia, Asia, Cilicia, and Spain. Most commentators suppose that there must be here some error, as that author first mentions Galatia and Armenia, and then Asia in general. Some, therefore, understand by the latter the city of Asia in Lydia; others have altered or rejected the word altogether; and Serapion, in his Arabic translation, seems to have read Syria. Professor Tychsen, however, assured me that *Asia proconsularis* is here meant, to which Cilicia did not belong; and in this particular sense the word is often used by writers cotemporary with Dioscorides. Of this difficulty Saumaise takes no notice.

We are informed by Pliny * that kermes were procured from Asia and Africa; from Attica, Galatia, Cilicia, and also from Lusitania and Sardinia; but those produced in the last-mentioned place were of the least value. Pausanias says that they were to be found in Phocis. As the *coccus* is mentioned likewise by Moses and other Hebrew writers, kermes must have been met with at that period in some of the remote countries of the East.* Bochart has quoted passages from the manuscript works of Arabian authors, which undoubtedly allude also to kermes;† and I shall class among these, without any hesitation, the account of Ctesias, which has been copied by Photius, Ælian, and the poet Phile, though in more than one circumstance it deviates from the truth.‡ It has already been considered by Tyson and Delaval as alluding to kermes, or rather the American cochineal, which Tyson, however, seems to confound with the *coccinella* genus of insects, in English called the lady-cow.§

---

* Plin. Hist. nat. lib. ix. cap. 41. lib. xvi. cap. 8. lib. xxii. cap. 2. lib. xxiv. cap. 4. The kermes of Galatia are mentioned by Tertullian, *de pallio*, p. 38, of the edition by De la Cerda, under the name of *Galaticus rubor*.

That the kermes-oak still grows and produces kermes‖ in the Levant, Greece, Palestine, Persia, and India, is sufficiently proved by the testimony of modern travellers. Bellon and Tournefort saw kermes collected in the island of Crete or Candia;* the former saw them also between Jerusalem and Damascus;† and he informs us that the greater part of them was sent to Venice. That they are indigenous in Persia, is expressly affirmed by Chardin.‡ The kermes of Spain are so well known that it is not necessary to bring proofs of their being a production of that country. Dioscorides says that the Spanish kermes were bad;§ and we are expressly told by Garidel,‖ that they are still of less value than the French.

---

* Bochart. Hierozoicon, vol. ii. lib. iv. cap. 27. p. 624. Petri Ravanelli Bibliotheca sacra. Genevæ 1660. fol. i. p. 480.

† I shall here give the translation of one of these passages: Alkermez est animal quod in spinosa planta generatur, et in arbusto, ex quo sulphurata fiunt ad ignem accendendum, mediæ magnitudinis inter herbam et arborem, ramis multis, sed tenuibus. Hoc autem animal instar lentis est initio valde parvum, sed augeri non desinit, donec ciceris magnitudinem assequatur.

‡ Photii Biblioth. p. 152. Æliani Hist. animal. iv. 46. Phile de animal. propriet. p. 143.

§ The Anatomy of a pigmy, by Tyson. London 1751, 4to. An Experimental inquiry into the cause of the changes of colours in opake bodies; by Ed. Hus. Delaval. London 1777, 4to. p. 24.

‖ The insect is not natural to the tree, but adventitious. As all rose-bushes have not tree-lice, nor all houses bugs; so all *ilices*, or oaks, have not kermes.

---

* Bellonii Itinerar. i. 17, p. 23. Voyage du Levant, par Tournefort, i. p. 19.

† Bellon. ii. 88. p. 145. See also Voyage de la Terre Sainte du P. Royer, Récollet, i. 2. and Voyages de Monconys, i. p. 179; Edward Brown's Merkwürdige Reisen: aus dem Englischen übersetzt, Nurnberg 1750, 4to. p. 145; Mariti Reisen durch Cypern, Syrien und Palestina. Altenburg 1777, 8vo. p. 155.

‡ Voyages de M. Chardin. A Rouen 1723. 12mo. ii. p. 313.

§ In opposition to this account some have asserted that Spanish kermes are praised in Petronius, cap. 119; but the passage varies so much, in different editions, that no certain conclusion can be drawn from it. See the excellent edition of Mich. Hadrianides. Amstelod. 1669, 8vo. p. 419. If we even read, with Hardouin and others,

Hesperium coccum laudabat miles,

the soldier might mention kermes among those productions of Spain of which he was fond, though he did not consider them as the best. Hardouin says, *Loquitur de minio Hispanico*; but that was a colour for painting.

‖ Ils preferent le kermes de Provence et de Languedoc à celui d'Espagne, parceque le premier donne une teinture plus vive; celui qui vient sur les arbrisseaux voisins de la mer, est plus gros et d'une

With the real nature of kermes the ancients were not acquainted. By the greater part they were considered as the proper fruit of the tree; and although they remarked the insects which proceeded from them, it was a common opinion that they were produced from putrefaction without propagation; and on this account they did not perceive their real origin. They imagined that the insects were the effects of corruption; and Pliny speaks as if he conceived that a certain species were liable to this fault more than others. They were therefore named *scolecion*, and less valued. But in another passage he calls kermes, not improperly, a scurf or scab of the tree, *scabies fruticis*. Dioscorides says, that the kermes appeared on the tree like lentils:* a comparison with which Matthiolus is highly displeased; but it cannot be altogether unnatural, as many of the moderns, who never read the writings of the Greeks, compare them also to lentils or peas. The account, that a kind of kermes in Sicily, like small snails, were collected by the women with their mouths, seems to be attended with more difficulty. The comparison of snails, which may not be altogether inconsistent, I shall admit; but the gathering with the mouth is too much contrary to common sense not to be disputed. Commenta-

couleur plus éclatante que celui qui vient aux autres endroits. *Histoire des plantes qui naissent aux environs d'Aix.* A Aix 1715. fol. p. 253.

* Προσκεινται δι κοκκοι ὡς φακοι.

tors, therefore, have proposed various emendations, which seem to be drawn from the different readings; but the common one alluded to must be very old, as it has been adopted by Serapion in his translation.* Marcellus and Cornarius are of opinion that a word must be inserted, expressive of the time when the kermes were gathered; and that instead of "with the mouth" ought to be read "in summer.†" For my part, I think a word signifying some instrument employed by the women in collecting them would be more proper; for the Grecian women, according to Bellon's account, use still for that purpose a small instrument shaped like a sickle. In France‡ and other countries, the women suffer the nails of their fingers to grow, in order that they may assist them in their labour.§

---

* Serapion says, according to the Latin translation, cap. 311. p. 210: Reperitur in arbore glandium interius Calchiæ animal testosum, parvum, simile limacis; et colligunt illud mulieres cum ore earum.— In my opinion the comparison of kermes to a snail refers only to the empty husks when the insects are dried. Garidel says, p. 248, Le kermes dans sa perfection, et lorsqu'on le ramasse, se présente à nos yeux comme une gousse dont la peau est assez ferme - - - - Cette gousse est ordinairement ronde, plus ou moins grosse qu'un pois.

† These writers propose to read εν τῳ ϑερει instead of τῳ στοματι: but the variation here is too great to be admitted.

‡ Garidel, p. 254: Leur habilité consiste sur tout à avoir les ongles longs.

§ Having mentioned the above passage to professor Tychsen, he suggested an emendation which, in my opinion, is preferable to any I have hitherto seen: "We must read," said he, "τῳ στονυχι, which transcribers may have readily mistaken and changed into the word στοματι, with which, perhaps, they were better acquainted. Στονυξ

However this may be, both Dioscorides and Galen ascribe to kermes an astringent, bitter taste; but I shall leave to the examination of physicians the medicinal qualities for which they have extolled them. I shall remark only, as a technologist, that kermes were used formerly, in dyeing purple, to give what is called the ground; but our dyers employ them to communicate a scarlet colour, which, without doubt, excels the purple of the ancients.

The first-mentioned use of kermes in dyeing seems to have been continued through every century. In the middle ages, as they are called, we meet with kermes under the name of *vermiculus* or *vermiculum*; and on that account cloth dyed with them was called *vermiculata*. Hence the French word *vermeil*, and its derivative *vermilion*, as is well known, had their extraction; the latter of which originally signified the red dye of kermes, but it is now used for any red paint, and also for fine pounded cinnabar. In France and Spain, at present, kermes, as soon as they are gathered, are besprinkled with vinegar and dried in the sun; but it appears that in the middle ages they were

---

signified not only the extremity of the nail, but also any kind of instrument, and even weapons, in which last sense it occurs more than once in Lycophron." See *Hesychius*. Much more forced and improbable is the amendment proposed by Saumaise, which may be found in his Annotations on Solinus.

not dried sufficiently, and that they were put into leather bottles to prevent them from making their escape.* In preparing the liquid dye, dyers used Egyptian alum, the only kind then to be had, and also urine.* This dye seems to have been known in Germany so early as the twelfth century; for among the productions of the country which Henry the Lion sent as a present to the Greek emperor we find *scarlata*.†

---

* The following passage, highly worthy of notice, taken from *Gervasii Tilberiensis Otia Imperialia ad Ottonem IV. Imperatorem*, iii. 55; a work which the author, a very learned man for his time, wrote in the year 1211, will serve to illustrate what I have said above: De vermiculo. In regno Arelatensi (*kingdom of Arles, which formerly belonged to the dukes of Burgundy*) et confinio maritimo est arbor cujus sarcina pretium facit duodecim nummorum Wighorniensium. Ejus fructus in flore facit pretium quinquaginta librarum. Ejus cortex ad onus vestis pretium habet quinque solidorum. Vermiculus hic est, quo tinguntur prætiosissimi regum panni, sive serici, ut examiti, sive lanei, ut scharlata. Et est mirandum, quod nulla vestis linea colorem vermiculatum recipit, sed sola vestis quæ ex vivo animanteque vel quovis animato decerpitur (*The author here is undoubtedly right, as animal substances take a dye more readily than vegetable*). Vermiculus autem ex arbore, ad modum ilicis et quantitatem dumi pungitiva folia habente, prodit ad pedem, nodulum faciens mollem ad formam ciceris (*the same comparison as that of Dioscorides*), aquosum, et, cum exterius colorem habeat nebulæ et roris coagulati, interius rubet; et cum ungue magisterialiter decerpitur, ne, tenui rupta pellicula, humor inclusus effluat, postquam exsiccatur et corio includitur.—Cum enim tempus solstitii æstivi advenerit, ex se ipso vermiculos generat, et nisi coriis subtiliter consutis includerentur, omnes fugerent aut in nihilum evanescerent. Hinc est, quod vermiculus nominatur propter dissolutionem quam in vermes facile facit, ex natura roris maialis, a quo generatur; unde et illo tantum mense colligitur. Arbor autem vermiculum generans vulgo Analis nuncupatur.—This book may be found in *Leibnitii Scriptor. rerum Brunsvic.* 1.—Mader caused only a small part of it to be printed, which I remark in order to rectify a mistake I committed in my *Phisikal-œconom. biblioth.* xv. p. 550.

---

* Muratori has published, in the second part of *Antiquitat. Italic. medii ævi*, p. 379, a treatise which appears to have been written in the ninth century, or in the time of Charlemagne, and which contains a great many receipts respecting dyeing and other arts. Among these is the receipt then commonly used for dyeing red: *Compositio vermiculi*. It is much to be regretted that the manuscript was so illegible that there are whole passages entirely destitute of sense; and that many words occur of which no one has given, or perhaps ever will be able to give, an explanation. We find, however, that the kermes were boiled with urine in a linen bag (*in linteolo raro*): *addis hurinam expumatam*. The other ingredients I confess I do not understand. What is *luzarim, lulacim, quianus, coccaris*? Many of these words seem to signify not simple but compounded igments. *Lulacim*, by p. 378, appears to have been the expressed juice of some plant boiled with alum. *Coccarin nascitur in folio cedrin non tritæ*. Besides the word *vermiculum*, the word *coccum* also occurs: *Coccum delabas in urina*. In the last sentence we ought to read *coctum*.

† See Barth. ad Guil. Britonis Philippidos, libr. xii. Cygneæ 1657, 4to. p. 614. Arnoldus Lubecensis, at the end of Helmoldi Chronicon Slavorum, lib. iii. cap. 4: Præmiserat autem dux munera multa et optima juxta morem terræ nostræ, equos pulcerrimos sellatos et vestitos, loricas, gladios, vestes de scharlatto et vestes lineas tenuissimas. See *Fischers Geschichte des Teutschen handels*. Hanover 1758, 8vo. i. p. 490. But can *munera juxta morem terræ nostræ* be with propriety translated 'the productions of the country?' With all due respect to the extensive reading and great learning of professor Fischer, I must warn the reader against some errors which occur in his book, and against his too bold assertions. From what he says, p. 448, one would suppose that he compared the kermes to our acorns; but the fruit only of the kermes-tree, as being a species of oak, has the figure of an acorn. In p. 493 he ventures to criticise

Our ancestors, in all probability, procured their kermes from the southern part of France, or rather from Spain. The Arabians, who from the earliest periods had been acquainted with this production in Africa, found it in Spain, and employed it there for dyeing, and as an article of commerce; and on this account, as appears, the Arabic name *kermes*, or *alkermes*, became so common.* Saumaise

professor J. H. Schulze, who, in *Dissertat. de granorum kermes coccionellæ convenientia, viribus et usu*, Halæ 1743, adopts the opinion of a Dutchman (not an Englishman) De Ruuscher, which has been completely justified, that cochineal is an insect. According to professor Fischer, both the insect and the acorn are cochineal. He talks of plantations of the kermes-tree among the ancients, and seems to believe that the Celts brought kermes along with them to Galatia, from their original country, in the same manner as the Europeans carried with them to America the corn of Europe. Kermes, however, are insects which cannot be transplanted, and I do not find any proof that there were ever plantations of them. People collected kermes in the places where they happened to find them. The comparison of cochineal with the lady-cow, or lady-fly, as it is called, p. 493, is altogether improper, as that insect is the *coccinella*, which has no affinity to cochineal. His proposal to place the *coccinella*, or lady-flies, on the kermes-oak, or on the *scleranthus* (perennial knawell), is totally impracticable; and even if that food should agree with these insects, they would never, were they to remain there for eternity, become cochineal or kermes.

* Matthiolus, in his Annotations on Dioscorides, p. 725, says that the monks who wrote a commentary on Mesues assert that the kermes of the Arabians, the *coccus radicum*, is not the *coccus arborum*; but he refutes this idea upon the grounds that the Arabians themselves say every thing of their kermes that is related of them by Dioscorides. I am almost induced to conjecture that the monks made this assertion in order to render more agreeable that tribute which was paid to them, in some countries, under the name of St. John's blood.

thinks that the Arabs borrowed this word from the Latins, and that it is formed from *vermes*;* but even if we allow that it is not an original Arabic word, it is, perhaps, more probable that it is of Celtic extraction, as is the opinion of Astruc.† *Guer*, or *quer*, signified in the Celtic language a green (ever-green) oak; and, in Lower Languedoc, uncultivated land, on which the kermes-oak grows, is still called *garrigues*. From this *guer* or *quer* Astruc is inclined to derive also the Latin word *quercus*, the etymology of which is no where else to be found. This conjecture is of the more importance as *mes*, in some parts, signifies the fruit of the oak; so that *guermes*, or kermes, would be the acorns, *les glands du chesne*. Although kermes are not acorns, we cannot reject this appellation as improbable. Having requested the opinion of professor Tychsen, as being well acquainted with the Arabic language, on this subject, he readily complied with my desire, and I have given it, in the note below, in his own words.‡ It deserves to be

---

* Salmasius in Solinum, p. 854.

† Mémoires pour l'histoire naturelle de Languedoc. Paris 1737, 4to. p. 472.

‡ The word *kermes*, *karmes*, and, with the article, *al kermes*, is at present in the East the common name of the animal which produces the dye, as well as of the dye itself. Both words have by the Arabs and the commerce of the Levant been introduced into the European languages. *Kermes*, Span. *al charmes*, *al quermes*, or more properly *alkermes*, *alkurmes*. Ital. *cremesino*, &c.

To what language the word originally belongs cannot with certainty be determined. There are grounds for conjecturing several remarked, that *carmesin*, *carmin*, *cramoisi* of the French, and *charmesi*, *chermesino* of the Italians, and other like words, hence derive their origin.

derivations from the Arabic: for example, *karasa*, *extremis digitis tenuit*, which would not ill agree with στονυξ; and *karmis* signifies *imbecillus*; but this word may be derived from the small insect, as well as the insect from it. As all these derivations, however, are attended with grammatical difficulties, and as the Arabians, according to their own account, got the dye and the word from Armenia, it appears rather to be a foreign appellation which they received with the thing signified, when they overran Upper Asia. Ibn Beithar in *Bochart*, *Hierozoicon*, ii. p. 625, calls kermes an Armenian dye; and the Arabian lexicographers, from whom Giggeus and Castellus made extracts, explain the kindred word *karmasal*, *coccineus*, *vermiculatus*, as an Armenian word.

This dye however was undoubtedly known to the Hebrews, the Phœnicians, and the Egyptians, long before the epoch of the Arabians in the East. Among the Hebrews the dye occurs, though not clearly, under other names, *tola schani*, or simply *tola*, in their oldest writer, Moses. *Tola* is properly the worm; and according to the analogy of *kermes*, worm-dye, scarlet. The additional word *schani* signifies either double dyed, or, according to another derivation, bright, deep red dye. For both significations sufficient grounds and old authorities might be quoted; but the former is the most usual, and, on account of its analogy with διβαφον, seems to be the most probable.

But was the *coccus* known so early? Is not *tola*, the worm-dye, perhaps the same with purple, because the ancients made no distinction between *vermis* and snail? I believe not. For purple the Orientals have a particular name, *argaman*, *argevan*, which is accurately distinguished from *tola*, and is often added to it as something distinct. All the ancients therefore translate the Hebrew word *tola* by κοκκος, kermes, *zehori* and *zehorito* (deep red, bright dye), which words they never put for *argaman*. As the Phœnicians traded at so early a period with Spain and other countries, where the kermes are indigenous, it may be readily comprehended how that dye was known in Palestine about and before the time of Moses.

The coccus found on the roots of some plants, as far as I know, has not been mentioned by the ancients. That these insects, however, were col-

It must have been known also in Egypt about the same epoch; for when Moses, in the wilderness, required scarlet to ornament the tabernacle, it could have been procured only from that country. Whether kermes be indigenous in Egypt, I do not know. On the word καλαϊνον, quoted by Bochart from Hesychius as Egyptian, the abbreviation of which, *laia*, in the Ethiopic language signifies scarlet, I lay no great stress, because it cannot be proved, 1st, that the word is originally Egyptian, as it occurs several times in the Greek writers and in various significations; and 2dly, that it signifies scarlet dye, because the ancients explain it sometimes by purple, sometimes by sea-colour. See *Bochart,* l. c. p. 730. If the word be Egyptian, it signifies rather red dye in general than defines purple colour. At any rate, there is in Coptic for the latter a peculiar word, *scadschi,* or *sanhadschi.* The latter is explained by Kircher in *Prodrom. Copt.* p. 337, *mercator purpuræ, vermiculus coccineus, purpura,* which is altogether vague and contradictory. The Arabic lexicographer, whom he ought to have translated, gives a meaning which expresses only *purple ware.*

If one might venture a supposition respecting the language of a people whose history is almost bare conjecture, I would ask if the Coptic *dholi* was the name of scarlet in Egypt. The lexicographers explain it by a worm, a moth; but in those passages of the translation of the Bible which I have compared another word is always used, when allusion is made to worms which gnaw or destroy. Was *dholi* the name of the worm that yields a dye? As *dholi* sounds almost like the Hebreo-Phœnician *tola,* we might farther conjecture that the Egyptians received both the name and the thing signified from the Phœnicians. But this is mere opinion. The following conclusions seem to be the natural result of the above observations:

1st. Scarlet, or the kermes-dye, was known in the East in the earliest ages, before Moses, and was a discovery of the Phœnicians in Palestine, but certainly not of the small wandering Hebrew tribes.

lected in Germany in the twelfth century, was first proved, as I think, by J. L. Frisch.* We are told that in this, and at least in the following century, several monasteries caused their vassals to collect this *coccus*, and bring to them by way of tribute,† and that those who could not deliver the production in kind were obliged to pay, in its stead, a certain sum of money. The measure by which it was delivered was called *coppus*, in Ger-

2d. *Tola* was the ancient Phœnician name used by the Hebrews, and even by the Syrians; for it is employed by the Syrian translator, Isaiah, chap. i. v. 18. Among the Jews, after their captivity, the Aramæan word *sehori* was more common.

3d. This dye was known also to the Egyptians in the time of Moses; for the Israelites must have carried it along with them from Egypt.

4th. The Arabs received the name kermes, with the dye, from Armenia and Persia, where it was indigenous, and had been long known; and that name banished the old name in the East, as the name scarlet has in the West. For the first part of this assertion we must believe the Arabs.

5th. Kermes were perhaps not known in Arabia; at least they were not indigenous, as the Arabs appear to have had no name for them.

6th. Kermes signifies always *red dye*; and when pronounced short, it becomes *deep red*. I consider it, therefore, as a mere error of the translation when, in *Avicenna*, iii. Fen. 21, 13, *kermesiah* is translated *purpureitas*. It ought to be *coccineum*.

---

* Beschreibung von allerley insekten; fünfter theil, Berlin 1736, 4to. p. 10.

† The ancient Spaniards, according to Pliny's account, were obliged to pay tribute in kermes to the Romans; and we are told by Bellon, that the Turks exact a tribute of the like kind from the modern Greeks. It appears, therefore, that the monks imitated the example of the Romans.

man *kopf*; which word signified, formerly, not only a globular drinking vessel, but also a measure both for dry and liquid things. It is still retained in the latter sense in Zurich, Achen, Regensburg, Austria, and several other places.* As the *coccus* was gathered at midsummer (St. John's day), it was called St. John's blood; probably, because the clergy wished by that appellation to make this revenue appear as a matter of religion; and that name is still continued among the country people. As the monks and nuns carried on at that time various trades, particularly that of weaving, they could employ the St. John's blood to very good purpose.†

---

* See Frisch's Teutsches Wörterbuch, and Krunitz's Encyclopedie, xliv. p. 2.

† In Leibnitii Collectanea etymologica, Hanoveræ 1717, 8vo. p. 467, there is a catalogue of the effects and revenues of the church at Prüm, where a monastery of Benedictines was established so early as the eighth century. *Registrum bonorum ecclesiæ Prumiensis.* This catalogue, which was drawn up in the year 1222, says: *Solvit unusquisque pro vermiculo denarios sex.* But because allusion is made here to people who lived near Metz in Lorraine, it may be conjectured that we are to understand not *coccus radicum,* but *coccus arborum,* which they might have procured from thence. For this doubt, however, there is no room in *Descriptio censuum, proventuum, ac fructuum ex prædiis monasterii S. Emmerammi,* in the year 1301, to be found in *Pezii Thesaurus anecdotorum novissimus,* Augustæ Vindel. 1721, fol. i. p. 69. We are there told, *Singuli dant sex denarios pro vermiculo*; and p. 69 and 74: *singuli dant vasculum verniculi*; p. 76: *reddunt vermiculi coppos duo.* The people of whom these passages speak belonged to the monastery of St. Emmeran, at Regensburg, and were settled in Bavaria. Papon relates in *Histoire générale de Provence,* Paris 1778, 4to. ii. p. 356, that the archbishop

At later periods I find mention of the *coccus* only in the works of naturalists, such as those of Cornarius,[*] Scaliger,[†] and others; but how long the use of it, and the collecting of it for religious houses, continued, I cannot determine; perhaps longest in Poland. From that country, even at present, a considerable quantity of it is sent every year to Venice; and I am inclined to believe that some of it is collected still in the county of Mark, and other parts of Germany. The following, as far as I can find, are the reasons why this indigenous production has lost its value. First, the root-kermes contain less colouring matter than the kermes of France and Spain. Secondly, the collecting of the former is more laborious as well as more tedious; and after they ceased to be paid *in natura* to the monasteries, they became too dear to stop the sale of those of France and Spain. But when the American cochineal, which is undoubtedly a far superior pigment, was in latter times made an article of commerce, and was sent

---

of Arles, in the middle of the twelfth century, sold to the Jews the kermes collected at St. Chamas and other parts of his diocese.

[*] 'Nascitur in Sarmatia ad Russiam spectante, in Podolia appellata regione, herba similis plantagini, quæ arno-glossum appellatur. Ad hujus radicem granum unum adnascitur, - - - quo, ad finem Maii et Junii principium, per quatuor hebdomadas collecto, antequam in vermem, alas postea acquirentem, abeat, serici et alii panni inficiuntur eo colore quem nostri *scharlach* et *kermasin* vocant. *In Dioscoridem*, iv. 39.

[†] De subtilitate; exercit. 325, § 13.

to Europe in large quantities for dyeing, as it could be procured at all times, and in abundance, at a price which, if not low, was at least moderate, considering its excellent quality, from Mexico, where labour was cheaper,* and where it was cultivated in plantations formed on purpose, the French and Spanish kermes were entirely forgotten, as appears by a French ordinance of 1671 respecting dye-stuffs: and this was the case much more with the German, which, in all probability, will never turn to great account, though some have entertained a contrary opinion.

Mexico, or New Spain, the original country of the cochineal, which word appears to be the diminutive of *coccus*,† was discovered by the Spaniards in 1518 and the years following. Who first remarked this profitable production, and made it known in Europe, I have not been able to discover. Some assert that the native Mexicans, before they had the misfortune of being visited by the Christians, were acquainted with cochineal, which they employed in painting their houses and dyeing their clothing;[*] but others maintain the contrary.[†] The Spaniards, who had long used kermes in their own country, could not fail soon to observe the superiority of the American; and I find by Herrera, that the king in the year 1523 desired to be informed by Cortez, whether what he had been told was true, that kermes were to be found in abundance in Mexico, and if they could, as was supposed, be sent with advantage to Spain. He requested him, should this information be true, to pay attention to it, and to cause them to be collected with diligence.[‡] This commodity must

---

* The price of cochineal has in latter times fallen. In the year 1728 it cost fifty-eight schellings Flemish per pound; but in May 1786 it cost only twenty-seven and a half. In *Schrebérs Erster Sammlung der Cameral Schriften*, part second, Halle 1758, p. 277, there is an egregious error in this respect, as is usual in such works. The price there is stated to be twenty-seven and a half rix-dollars Flemish per pound. In the first volume of the History of Inventions, in the article Lacmus, I have been led to make an erroneous assertion by false information. Sifted cochineal is commonly half a schelling Flemish, or three styvers, dearer than unsifted. It is often adulterated in Spain, but oftener in Holland, with the wild cochineal, as it is called. Some years ago an Englishman adulterated this article by mixing it with red wax; but the fraud required too laborious preparation, and was attended with too little profit to be long continued. The latter information is taken from a letter of Mr. Riesemann, dated Amsterdam, June 1788.

† There is reason to think that the Spaniards gave as names to several American articles the diminutives of like Spanish or Eu-

---

ropean productions. Thus *sarsaparilla* signifies prickly vine-stock; *platina* little silver. Is the cause of this to be referred to the Spanish *grandezza?*

[*] Raynal, in Histoire philosophique des établissemens dans les Indes. Geneve 1780, 4 vol. quarto, ii. p. 77.

[†] Algemeine geschichte der länder und völker von Amerika, Halle 1753, 2 vol. quarto, ii. p. 7.

[‡] Y aviendo tenido el Rey noticia, que en Nueva España nacia grana en abundancia, y que trayda a Castilla podia redundar en mucho provecho para las rentas reales, mandò al Governador que lo mirasse, y hiziesse coger, y avisasse luego si esto era verdad, y que le parecia, que para beneficiarla se podia hazer. *Historia general de los hechos de los Castellanos en las islas y tierra firme del mar oceano,*

soon after have begun to be an object of commerce; for Guicciardini, who died in 1589, mentions cochineal among the articles procured then by the merchants of Antwerp from Spain.* The plant on which the animal lives, belongs to the genus of the *cactus*, and in Mexico is called *nopal* or *tuna*, though several plants of the same kind seem to be comprehended under the latter name. One kind is the *opuntia*, which has become indigenous in Spain,† Portugal, and Italy, and which is not scarce in our green-houses. Whether the *cochinillifera* be already sufficiently described, is still doubtful; and according to the latest information, there is reason to believe that it is not. Oviedo‡ described and gave figures of two kinds of *tuna;* but of the cochineal he makes no mention. He speaks however of an excellent dye which the Americans prepared from the fruit, and formed into small cakes; but he afterwards acknowledges that he had received no authentic account on this subject. I nevertheless suspect that these cakes were made of cochineal; for Hernandez says, that such were made in his time.

---

por Antonio de Herrera. En Madrid 1601, fol. decada tertia, v. 3. p. 194.

[*] See Anderson's Geschichte des handels, iv. p. 73. It is possible however, that Guicciardini may have meant Spanish kermes.

[†] See Ueber sitten, temperament und gerichtshöfe Spaniens : von einem reisenden beobachter. Leipzig 1782, 2 parts, 8vo. i. p. 103.

[‡] Histoire naturelle et générale des Indes. Paris 1556, fol. p. 122, 130.

With the first cochineal, a true account of the manner in which it was procured must have reached Europe, and become publicly known. Acosta, in 1530, and Herrera in 1601, as well as Hernandez and others, gave so true and complete a description of it, that the Europeans could entertain no doubt respecting its origin. The information of these authors, however, was either overlooked or considered as false, and disputes arose whether cochineal was insects or worms, or the berries or seeds of certain plants. The Spanish name *grana*, confounded with *granum*, may have given rise to this contest; but there is not, perhaps, in all natural history a point which can be so fully cleared up as this can by the most undoubted testimony. A Dutchman, named Melchior de Ruusscher, affirmed in a society, from oral information he had obtained in Spain, that cochineal was small animals. Another person, whose name he has not made known, maintained the contrary with so much heat and violence, that the dispute at length ended in a bet. Ruusscher charged a Spaniard, one of his friends, who was going to Mexico, to procure for him in that country authentic proofs of what he had asserted. These proofs, legally confirmed in October 1725, by the court of justice in the city of Antiquera, in the valley of Oaxaca, arrived at Amsterdam in the autumn of the year 1726. I have been informed that Ruusscher upon this got possession of the sum betted, which amounted to the whole property of the loser; but that, after keeping it a certain time, he again returned it, deducting only the expenses he had been at in procuring the evidence, and in causing it to be published. It formed a small octavo volume, with the following title, printed in red letters: *The History of Cochineal, proved by authentic documents.** These proofs sent from New Spain are written in Dutch, French, and Spanish.

It may be readily supposed, that the high esteem in which this production was held, would soon induce people to endeavour to convey these insects to other countries in order to breed them. This the Spaniards did every thing in their power to prevent: and notwithstanding the severity of the means which they employed, attempts were made for that purpose; but they never succeeded, and have now been abandoned. When Rolander, a scholar of Linnæus, was in America, he sent to Upsal, at the request of that celebrated naturalist, a plant, with the insects upon it. The plant arrived in the year 1756, when Linnæus was engaged with his pupils. The gardener, who was not acquainted with the nature of it, cleared it from what he thought vermin, and planted it; so that Linnæus, when he returned from his class, did not find a single insect alive. This circumstance, which he has mentioned in his *Systema Naturæ*, I was told by himself. I am however of opinion, that this was not the real cochineal, but the other kind spoken of by Sylvester; as the former, according to the latest information, can scarcely be procured even with more labour and expense than Rolander could bestow, and would hardly stand such a long voyage to the northern regions. The spurious kind were sent from Jamaica to England, on the *Opuntia ficus Indica*, which was planted by Miller,* but the insects did not live above three or four months. Thiery, a young French naturalist, brought the real cochineal to St. Domingo in the year 1777, at so much hazard that he deserves a place in the martyrology of the naturalists; but after his death, which soon followed, the insects perished through the avarice or negligence of his successors; and in that island there are none now to be found but the spurious kind.†

---

* The title in the original is: *Natuerlyke historie van de couchenille, beweezen met authentique documenten.* Histoire naturelle de la cochenille, justifiée par des documens authentiques. T'Amsterdam. By Hermanus Uytwerf, 1729, 8vo. 175 pages. This work, which I have in my possession, is scarce. A translation of it however may be found in (C. Mylius) Physikalischen belustigungen; Berlin 1751, 8vo. i. p. 43.

I am inclined to believe that the art of employing kermes to dye a beautiful red colour was discovered in the East at a very early period; that it was soon so much improved as to excel even the Tyrian purple; and that it contributed to cause the proper purple to be at length abandoned. From the costly red dyes extolled so much by the Hebrew writers, and which, according to the opinion of learned commentators, were made from kermes, I shall not venture to adduce any proofs, as I am not acquainted with the Oriental languages to examine their accounts with accuracy; but I have found a passage in Vopiscus,* which seems to render my conjecture very probable. That author informs us, that the king of Persia sent to the emperor Aurelian, besides other articles of great value, some woollen cloth, which was of a much costlier and brighter purple colour than any that had been ever seen in the Roman empire, and in comparison of which all the other purple cloth worn by the emperor and the ladies of the court appeared dull and faded. In my opinion, this cloth, which was of a beautiful purple red colour, was not dyed with the liquor of the murex, but with kermes. This idea was indeed not likely to occur to the Romans, who were acquainted only with the purple of the murex, and who had less experience in the arts in general than in that of robbing and plundering, or who at any rate in that respect were inferior to the Orientals. The Roman emperors caused this supposed purple to be sought for in India by the most experienced dyers, who, not being able to find it, returned with a vague report that the admired Persian purple was produced by the plant sandix. I am well aware, that some commentators have supposed that the sandix was our madder.* Hesychius, however, says, very confidently, that the *sandix* is not a plant, but a kind of shrubby tree which yields a dye like the *coccus*.† The Roman dyers, perhaps, prejudiced in favour of the murex, made that only the object of their search; and their labour proving fruitless, they might have heard something of kermes, or the kermes-oak, which they did not fully understand. Our dyers, even at present, believe many false accounts respecting the dye-stuffs which they use daily.

---

* Miller's Gardener's Dictionary.

† Traité de la culture du nopal et de l'éducation de la cochenille. Au Cap-François 1787, 8vo. Of this work, which deserves notice, I have given a particular account in my *Physikalisch-œconom. Bibliothek*, xv. p. 594.

---

* Genus purpuræ, quod postea nec ulla gens detulit, nec Romanus orbis vidit, de qua pauca saltem libet dicere. Meministis enim fuisse in templo Jovis Optimi Maximi Capitolini pallium breve purpureum lanestre, ad quod cum matronæ atque ipse Aurelianus jungerent purpuras suas, cineris specie decolorati videbantur cæteræ divini comparatione fulgoris. Hoc munus rex Persarum ab Indis interioribus sumptum, Aureliano dedisse perhibetur, scribens: Sume purpuram qualis apud nos est. Sed hoc falsum fuit. Nam postea diligentissime et Aurelianus et Probus et proxime Diocletianus, missis diligentissimis confectoribus, requisiverunt tale genus purpuræ, nec tamen invenire potuerunt. Dicitur enim sandix Indica talem purpuram facere, si curetur. *Vopiscus in Vita Aureliani, cap.* 29.

---

* Those who are desirous of further information respecting the *sandix*, may consult Saumaise on Solinus, p. 810, and the editor of the *Cyneget*. of Gratius Faliscus, x. 86. p. 46.

† Σανδυξ, δενδρον θαμνωδες, ὁυ το ανθος χροιαν κοκκῳ εμφερη εχει. Some have considered sandix as a mineral. Minerals however can be used for painting but not for dyeing. It may be replied that the Romans themselves dyed with kermes at this period, and that they must have easily procured it. But they understood the art of dyeing with it so badly that they employed it only for giving the ground of their purple, and on that account it must have appeared improbable to them that the people in India could produce by it a more beautiful colour than their purple was. From the like ignorance in modern times, indigo was decried, because people imagined that a complete colour could not be communicated by it; and this false conclusion retarded many improvements in the art of dyeing. It is very

In latter times, when it was known that the beautiful Oriental kermes-dye was not properly purple, it was no longer called by that name, but was considered as a new dye, and acquired a new appellation. Cloth dyed with it was called *scarlata, squarlata, scarleta, scarlatina, scharlatica.* That these words have an affinity to our scarlet, every one allows, but it may be difficult to discover their origin. Pezronius* affirms, that they are of Celtic extraction, and have the same signification as *Galaticus rubor*. Astruc, as I have already shown, derives kermes from the same language, which, however, like the Egyptian history, is often employed to explain what people cannot otherwise explain, because so little is known of both that much contradiction is not to be apprehended. Others wish to make scarlet from the *quisquilium, cusculium,* or *scolecium* of Pliny. To some the word appears to be composed of the first half of kermes and lack,

---

likely that the Greeks and the Romans were unacquainted with the effect produced upon kermes by acids, which the Persians and Indians used.

* Antiquit. Celt. p. 69, 70.

with the addition of only an S, and every one is left at liberty to determine at pleasure, whether lack is to be understood as the Arabic for red, or the German word *lacken* cloth. In the first case it signifies the same as *vermiculare rubrum;* in the latter *pannus vermicularis.* Stiler[*] says *scarlach* is entirely German, and compounded of *schor* the fire, and *laken* cloth, so that its real signification is fire-cloth, fire-coloured cloth. Reiske, on the other hand, asserts, that the word is originally the Arabic *scharal*, which means the kermes dye.[†] Which of these conjectures is most agreeable to truth, cannot with certainty be concluded; but that the word is older than Dillon affirms it to be, on the authority of a Spaniard, can be proved. Dillon says that it was first used by Roderick, archbishop of Toledo, who finished his history of Spain in 1243.* Vossius † has quoted several writers who use *escarletum* or *scarletum*. The oldest is Cæsarius, who lived about the year 1227. Matthew Paris, who wrote about the year 1245, used the word in 1134. But I find that the emperor Henry III, in the middle of the eleventh century, conferred upon the count of Cleves the burg-graviate of Nimeguen, on condition of his delivering to him yearly three pieces of scarlet cloth made of English wool.‡ The word may be often found in the twelfth century. It occurs in Petrus Mauritius, § who died in 1157, and also in the writings of Arnold, who, in 1175, was the first abbot of Lubeck.

---

[*] Spaten (Stiler) der Teutschen Sprache Stammbaum, 1691, 4to. p. 1062.

[†] In his annotations on *Constantini Libri de ceremoniis aulæ Byzantinæ*, ii. p. 137, he says: Vocabulum scharal, quod coccineum colorem notat, in Golii Lexico non prostat; habetur tamen in Moallacah quinta. Reiske also on this occasion gives the derivation from *Charlatan*, a mountebank, juggler, *circumforaneus, agyrta*, because such people formerly on account of their red clothes were called *scarlatati* or *scarlatani.* Other conjectures respecting this word may be found in *Dictionnaire étymologique*, par M. Menage, Paris 1750, fol. i. p. 354. See in the same work also, p. 498, the word *écarlate.* In ancient French writers the highest degree of any colour in its perfection is called *écarlate*, and we therefore meet with *écarlate blanche, écarlate verte. Braun de vestitu sacerd. Hebræor.* Amstelod. 1701, 4to. lib. i. cap. 15. p. 229, says: *Salacka*, Tyrian red, from *sar*, Tyrus. He controverts the opinion of Gronovius that *scarlatum* is derived from *Galaticum.*

Of the preparation and goodness of the ancient scarlet we certainly know nothing: but as we find in many old pieces of tapestry of the eleventh century, and perhaps earlier, a red which has continued remarkably beautiful even to the present time, it cannot at any rate be denied, that our ancestors extolled their scarlet not without reason. We may however venture to assert, that the scarlet prepared at present is far superior, owing principally to the effects of a solution of tin. This invention may be reckoned among the most important improvements of the art of dyeing, and deserves a particular relation.

---

* Travels through Spain, by John Talbot Dillon. London 1780, 4to. p. 21. Rod. Toletanus de rebus Hispan. lib. vii. 1.

† G. J. Vossius de vitiis sermonis. Amstelodami 1645, 4to. p. 197, 276, 802, 810. Cæsarius, lib. ix. miracul. 18.

‡ Pontani Historia Gelrica, Herdervici 1639, fol. p. 83: Tres pannos scarlitinos Anglicanos. The year seems to have been 1050. In *Lunigs Codex diplom. Germaniæ*, ii. p. 1739, may be seen a document of the year 1172, in which the emperor Frederick I confers on the count of Gueldres the heritable jurisdiction of Nimeguen, on condition, *ut* ipse et ejus successores imperatori de eodem telonio singulis annis tres pannos scarlacos bene rubeos Anglicenses ardentis coloris—assignare deberet.

§ Petrus Mauritius, in Statutis Cluniacensibus, cap. 18: Statutum est, ut nullus scarlatas, aut barracanos vel pretiosos burellos habeat.

The tincture of cochineal alone yields a purple colour, not very pleasant, which may be heightened to the most beautiful scarlet by a solution of tin in aqua-regia.* Mr. Ruhlenkamp at Bremen, one of the most learned dyers of Germany, and who has studied with great care every new improvement of his art, gave me the history of this scarlet-dye, as I have already related in my Introduction to Technology.† The well-known Cornelius Drebbel, who was born at Alkmaar, and died at London in 1634, having placed in his window an extract of cochineal, made with boiling water, for the purpose of filling a thermometer, some aqua-regia dropped into it from a phial, broken by accident, which stood above it, and converted the purple dye into a most beautiful dark red. After some conjectures and experiments, he discovered that the tin by which the window-frame was divided into squares had been dissolved by the aqua-regia, and was the cause of this change. He communicated his observation to Kuffelar, an ingenious dyer at Leyden, who was afterwards his son-in-law.* The latter brought the discovery to perfection, and employed it some years alone in his dye-house, which gave rise to the name of Kuffelar's-colour.† Becher calls him Kuffler.‡ Kunkel, in a passage which I cannot again find, makes his name Kuster, and says that he was a German. In the course of a little time the secret became known to an anabaptist called Gulich, and also to another person of the name of Van der Vecht, who taught it to the brothers Gobelins in France. Giles Gobelin, a dyer at Paris, in the time of Francis I, had found out an improvement of the then usual scarlet dye; and as he had remarked that the water of the rivulet Bievre, in the suburbs St. Marceau, was excellent for his art, he erected on it a large dye-house, which, out of ridicule, was called *Folie-Gobelins*,‖ Gobelin's-Folly. About this period, a Flemish painter, whom some name Peter Koek, and others Kloek, and who had travelled a long time in the East, established, and continued to his death in 1550, a manufactory for dyeing scarlet cloth by an improved method.* Through the means of Colbert, one of the Gobelins learned the process used for preparing the German scarlet-dye from one Gluck, whom some consider as the above-mentioned Gulich, and others as Kloek; and the Parisian scarlet-dye soon rose into so great repute, that the populace imagined that Gobelin had acquired his art from the devil.† It is well known that Louis XIV, by the advice of Colbert, purchased Gobelin's building from his successors in the year 1667, and transformed it into a palace, to which he gave the name of *Hôtel royal des Gobelins*, and which he assigned for the use of first-rate artists, particularly painters, jewellers, weavers of tapestry, and others. After that time the rivulet was no longer called Bievre, but Gobelins. About the year 1643, a Fleming, named Kepler, established the first dye-house for scarlet in England, at the village of Bow, not far from London; and on that account the colour was called, at first, by the English, the *Bow-dye*.‡ In the year 1667, another Fleming, named Brewer, invited to England by king Charles II, with the promise of a large salary, brought this art there to great perfection.* All these accounts, however, and the names of the persons, are extremely dubious.

---

* See Porner's Anleitung zur Farbekunst. Leipzig 1785, 8vo. p. 16.

† Page 113.

---

* Monconys mentions in his Travels, p. 408, Dr. Keiffer, a son-in-law of Drebbel, who was a good chemist.

† In Borrichii Dissertat. ii. p. 104: Color Kufflerianus.

‡ Närrische Weisheit, p. 71.

‖ Rabelais, xi. 22. Menage, Diction. étymol. i. p. 682.

---

* Francheville, in Dissertat. sur l'art de la teinture des anciens et modernes, in Histoire de l'academ. de Berlin, 1767, p. 67. In this dissertation, however, there is neither certainty nor proof.

† Suite de teinturier parfait. Paris 1716.

‡ Anderson's History of Commerce.

WRITING-PENS.

As long as people wrote upon tables covered with wax, they were obliged to use a style or bodkin made of bone, metal, or some other hard substance; but when they began to write with coloured liquids, they then employed a reed, and afterwards quills or feathers. This is well known, and has been proved by various authors.† There are two circumstances however in regard to this subject, which require some further research; and which I shall endeavour to illustrate by such information as I have been able to collect. With what kind of reeds did people write? When, and where were feathers first employed for that purpose?

---

* Cary's Bemerkungen über Grossbritanniens handel; übersetzt von Wichmann. Leipzig 1788, i. p. 372. Boyle remarks in his *Experimenta de coloribus*, Coloniæ 1680, 4to, that a bright scarlet colour was never produced except when tin vessels were used. It appears, therefore, that he had observed the good effects of a solution of tin.

† This may be found proved in *Fabricii Bibliotheca antiquaria*, p. 959, and in *Reimmanni Idea systematis antiquitatis litterariæ*, Hildesheim 1718, 8vo. p. 169. Of modern writers, see the Origin and progress of writing as well hieroglyphic as elementary; by Thomas Astle. London 1784, 4to.

It is rather astonishing, that we are ignorant what kind of reeds the ancients used for writing, though they have mentioned the places where they grew wild, and where, it is highly probable, they grow still. Besides, we have reason to suppose, that the same reeds are used even at present by all the Oriental nations; for it is well known, that among the people of the East old manners and instruments are not easily banished by new modes and new inventions. Most authors who have treated on the history of writing have contented themselves with informing their readers that a reed was employed; but the genus of plants called by the ancients *calamus*, and *arundo*, is more numerous in species than the genus of grasses, to which their corn belonged; and it might perhaps be as difficult to determine with accuracy what kind of reed they employed for writing, as to distinguish the species of grain called *far*, *alica* and *avena*.

The most beautiful reeds of this kind grew formerly in Egypt;* near Cnidus, a city and district in the province of Caria, in Asia Minor;† and likewise in Armenia and Italy.‡ Those which grew in the last-mentioned country, seem to have been considered by Pliny as too soft and spongy: but his words are so obscure that little can be gathered from them; and though the above places have been explored in latter times by many experienced botanists, they have not supplied us with much certain information respecting this species of reed. It is however particularly mentioned by the old botanists, who have represented it as a stem, such as I have seen in collections; but as they give no characterizing marks sufficiently precise, Linnæus was not able to assign any place in his system to the *arundo scriptoria* of Bauhin.*

---

* Plin. lib. xvi. cap. 35. Martial. lib. xiv. epigram. 38: Dat chartis habiles calamos Memphitica tellus.

† Plin. lib. c. Catullus, carm. xxxvi. 13, mentions Cnidus arundinosa. Ausonius, epist. iv. 75, calls the reeds Cnidii nodi.

‡ Chartis serviunt calami; Ægyptii maxime, cognatione quadam

Chardin speaks of the reeds which grow in the marshes of Persia, and which are sold and much sought after in the Levant, particularly for writing. He has even described them; but his account has been of no service to enlarge our botanical knowledge.† Tournefort, who saw them collected in the

---

papyri; probatiores tamen Gnidii, et qui in Asia circa Anaiticum lacum nascuntur. Noſtratibus fungosior subest natura, cartilagine bibula, quæ cavo corpore intus, superne tenui inarescit ligno, fissilis præacuta semper acie, geniculata. *Plin.* lib. xvi. cap. 36.

* Bauhini Pinax plantar. p. 17: *Arundo scriptoria atro-rubens.* Hist. plant. ii. p. 487. Theatrum botan. p. 273.

† Their writing-pens are made of reeds or small hard canes of the size of the largest swan-quills, which they cut and slit in the same manner as we do ours; but they give them a much longer nib. These canes or reeds are collected towards Daurac, along the Persian Gulf, in a large fen supplied with water by the river Hellé, a place of Arabia formed by an arm of the Tygris, and another of the Euphrates united. They are cut in March, and, when gathered, are tied

neighbourhood of Teflis, the capital of Georgia, though his description of them is far from complete, has taught us more than any of his predecessors. We learn from his account, that this reed has small leaves, that it rises only to the height of a man, and that it is not hollow but filled with a soft spongy substance. He has characterized it, therefore, in the following manner in his System of Botany: *Arundo orientalis, tenuifolia, caule pleno, ex qua Turcæ calamos parant.*[*] The same words are applied to it by Miller; but he observes that no plants of it had ever been introduced into England.[†] That the best writing-reeds

---

up in bundles and laid for six months under a dunghill, where they harden and assume a beautiful polish and lively colour, which is a mixture of yellow and black. None of these reeds are collected in any other place. As they make the best writing-pens, they are transported throughout the whole East. Some of them grow in India, but they are softer and of a paler yellow colour. *Voyages de Chardin*, vol. v. p. 49.

[*] It is a kind of cane which grows no higher than a man. The stem is only three or four lines in thickness, and solid from one knot to another, that is to say filled with a white pith. The leaves, which are a foot and a half in length, and eight or nine lines in breadth, enclose the knots of the stem in a sheath; but the rest is smooth, of a bright yellowish green colour, and bent in the form of a half tube, with a white bottom. The panicle or bunch of flowers was not as yet fully blown, but it was whitish, silky, and like that of other reeds. The inhabitants of the country cut the stems of these reeds to write with, but the strokes they form are very coarse, and do not approach the beauty of those which we make with our pens. *Voyage du Levant*, vol. ii. p. 136.

[†] Tournefort, Instit. rei herb. in corollario, p. 39. Miller's Gardener's Dictionary.

are procured from the southern provinces of Persia is confirmed by Dapper* and Hanway.† The former says, that the reeds are sown and planted near the Persian Gulf in the place mentioned by Chardin, and he gives the same description as that traveller of the manner in which they are prepared.

The circumstance expressly mentioned by Tournefort, that these writing-reeds are not entirely hollow, seems to agree perfectly with the account given by Dioscorides.‡ It is probable that the pith dries and becomes shrunk, especially after the preparation described by Chardin, so that the reed can be easily freed from it in the same manner as the marrowy substance in writing-quills is removed from them when clarified. Something of the like kind seems to be meant by Pliny, who, in my opinion, says that the pith dried up within the reed, which was hollow at the lower end, but at the upper end woody and destitute of pith. What follows refers to the flowers, which were employed instead of feathers for beds, and also for caulking ships.* I conjectured that Forskal had given an accurate description of this reed; but when I consulted that author, I did not find what I expected. He only confirms that a great many reeds of different kinds grow near the Nile, which serve to make hedges, thatch, and wattled-walls, and which are used for various other purposes.†

---

* Beschreibung von Asia. Nurnberg 1681, fol. p. 142.

† Reise, i. p. 233.

‡ Lib. i. cap. 114: Αλλος συριγγιας, πολυσαρκος, πυκνογονατος, εις βιβλιογραφιαν επιτηδειος. Alia syringias, hoc est fistulosa, multa carne prædita, geniculis densior, ad librorum scriptionem accommodata. Some read ολιγοσαρκος. Non est verisimile, says Saracen, fuisse adeo πολυσαρκον, sed vacuum potius et inanem fistularum modo. Rauwolf says in his Travels, vol. i. p. 93: In the shops were to be sold small reeds, hollow within and smooth without, and of a brownish red colour, which are used by the Turks, Moors, and other Eastern people, for writing. It appears that Rauwolf did not see these reeds growing, but prepared and freed from the pith. We are told by Winkelmann, in his second Letter on the Antiquities of Herculaneum, p. 46, that for want of quills he often cut into writing-pens those reeds which grow in the neighbourhood of Naples.

These reeds were split, and formed to a point like our quills;‡ but certainly it was not possible to make so clean and fine strokes, and to write so long§ and so conveniently with them as one can with quills. The use of them, however, was not entirely abandoned when people began to write with quills, which in every country can be procured from an animal extremely useful in many other respects. Had the ancients been acquainted with the art of employing goose-quills for this purpose, they would undoubtedly have dedicated to Minerva not the owl but the goose.

---

* Cætero gracilitas nodis distincta, leni fastigio tenuatur in cacumina, crassiore paniculæ coma; neque hac supervacua; aut enim pro pluma strata cauponarum replet; aut, ubi limosiore callo induruit, sicut in Belgis, contusa et interjecta navium commissuris ferruminat textus, glutino tenacior, rimisque explendis fidelior pice.

† Flora Ægyptiaco-Arabica. Havniæ 1775, 4to. p. 47, 61.

‡ On this account they are called, in some old epigrams, *καλαμοι μεσοσχιδεις, μεσοτομοι, διαγλυπτοι*; and, in Ausonius, *calami fissipedes*. See Winkelmann, Erstes Sendschreiben, p. 85.

§ Those who wish to see instances of learned men who wrote a great deal and a long time with one pen, may consult *J. H. Ackeri Historia pennarum*, Altenburgi 1726, four sheets in octavo. The author has collected every thing he ever read respecting the pens of celebrated men. This work, of which I found an account in Fabricius's *Bibliotheca Antiq.* I should not have mentioned, had I not imagined that the title might induce people to believe that it contains the history of writing-quills.

A passage in Clemens of Alexandria, who died in the beginning of the third century, might on the first view induce one to conjecture that the Egyptian priests even wrote with quills. This author, after describing a procession of these priests, says, The sacred writer had in his hand a book with writing-instruments, and on his head feathers.[*] But it is impossible to guess what might be the intention of these feathers or wings on the head, among a people who were so fond of symbols. Besides, Clemens tells us expressly, that one of the writing-instruments was a reed with which the priests used to write.

Some assert from a passage of Juvenal,[†] that quills were used for writing in the time of that poet; but what he says is only a metaphorical expression, such as has been employed by Horace* and various ancient writers. Others have endeavoured to prove the antiquity of writing-quills from the figure of the goddess Egeria, who is represented with a book before her, and a feather in her right hand; but the period when this Egeria was formed is not known, and it is probable that the feather was added by some modern artist.† No drawings in manuscripts, where the authors appear with quills, are of great antiquity. Among these is the portrait of Aristotle, in a manuscript in the library of Vienna, which, as expressly mentioned at the end, was drawn at Rome in the year 1457; and we have great reason to think that the artist delineated the figure for ornamenting his work, not after an ancient painting, but from his own imagination.‡

---

[*] Deinceps ιερογραμματευς, id est, scriba sacrorum, pennas habens in capite (εχων πτερα επι της κεφαλης) et librum in manibus, ac regulam, in qua est et atramentum ad scribendum, et juncus, quo scribunt (σχοινος η γραφουσι), progreditur. *Clementis Alex. Opera.* Coloniæ 1688, fol. p. 633. The best account of these sacred writers may be found in the *Prolegomena,* p. 91, of *Jablonski's Pantheon Egypt.*

[†] — — tanquam diversis partibus orbis
Anxia præcipiti venisset epistola penna.
JUVENAL. sat. iv. 149.

If credit can be given to the anonymous author of the history of Constantius, extracts from which have been made known by Adrian de Valois, the use of quills for writing is as old as the fifth century. We are informed by this author, who lived in the above century, that Theodoric, king of the Ostrogoths, was so illiterate and stupid, that during the ten years of his reign he was not able to learn to write four letters at the bottom of his edicts. For this reason the four letters were cut for him in a plate of gold, and the plate being laid upon paper, he then traced out the letters with a quill.* This account is, at any rate, not improbable; for history supplies us with more instances of such men not destined for the throne by nature, but raised to it either by hereditary right or by accident, who had neither abilities nor inclination for those studies which it requires. The western empire was governed, almost about the time of Theodoric, by the emperor Justin, who also could not write, and who used in the like manner a piece of wood, having letters cut in it, but with this difference, that, in tracing them out, he caused his hand to be guided by one of his secretaries.*

---

* — — — — Si celeres quatit
Pennas, resigno quæ dedit.
HORAT. od. iii. 29, 53.

† Gronovii Thesaurus antiq. Græc. ii. n. 28. Dulodori (Laur. Bergeri) Colloquium de tribus Antiquitatum Græc. voluminibus. Berolini 1702, fol. p. 14.

‡ Lambec. lib. vii. p. 76. Montfaucon, Palæograph. Græca. Paris 1708, lib. i. cap. 3. p. 21.

---

* Rex Theodoricus inliteratus erat et sic bruto sensu, ut in decem annos regni sui quatuor literas subscriptionis edicti sui discere nullatenus potuisset. De qua re laminam auream jussit interrasilem fieri, quatuor literas regis habentem, Theod. ut, si subscribere voluisset, posita lamina super chartam, per eam penna duceret, et subscriptio ejus tantum videretur. *Excerpta auctoris ignoti de Constantio et aliis impp.* added to *Ammiani Marcellini Hist.* ed. Valesii. Parisiis 1681, fol. p. 699. I have in my possession *Miscella antiquæ lectionis,* Simonis Paulli, *bibliopol. Argentin. impensis.* Argentorati 1670, 8vo. in which the whole passage is printed, p. 33, with annotations by Valois. A friend with whom I conversed on this subject seemed to think that the letters might be raised on the plate, or deeply engraven in it, so that Theodoric only followed with his pen an impression of them made upon the paper. The word *interrasilis* has indeed been used at later periods for *anaglyphis*, to signify raised work, carved work, or *bas-relief*; but the words *per eam penna duceret* make, I think, my opinion more probable. At any rate Pliny, b. xii. c. 19, uses *interrasilis* for work cut through. See *Gesner's Stephanus.*

The oldest certain account however known at present respecting writing-quills, is a passage of Isidore, who died in the year 636, and who, among the instruments employed for writing, mentions reeds and feathers.† Another proof of quills being used in the same century, is a small poem on a writing-pen, to be found in the works of Althelmus, called sometimes also Aldhelmus, Adelhemus, and Adelmus. This writer, descended of a noble family, was the first Saxon who wrote Latin, and who made the art of Latin poetry known to his countrymen, and inspired them with a taste for compositions of that kind. He died in the year 709.*

---

* Ut aliquod imperatoris manus extaret argumentum, a magistratu, qui id muneris habet, excogitatum est hoc. Tabellæ ligneæ perpolitæ formam quatuor literarum, quæ legi Latine possent, incidendum curant (εγκολαψαντες,) eaque libello imposita, calamus colore imbutus (γραφιδα βαφη βαψαντες) quo scribere mos est imperatoribus, huic principi tradebatur in manum, quam alii prehensantes ducebant, circumagebantque calamum (γραφιδα) per quatuor illas literarum formas, nempe singulas tabellæ incisuras (εντομας,) atque ita demum iis ab imperatore literis reportatis recedebant.—From this passage however, we cannot learn whether the characters were followed with a style, a reed, or a quill; for γραφις is the general appellation. - - - There have been princes, also, acquainted with writing, but so lazy that they kept a servant who could imitate their hand to subscribe for them. Of this we have an instance in the emperor Carinus, respecting whom Vopiscus says: Fastidium subscribendi tantum habuit, ut quendam ad subscribendum poneret qui bene suam imitaretur manum.

† Instrumenta scribæ calamus et penna. Ex his enim verba paginis infiguntur; sed calamus arboris est, penna avis, cujus acumen

In the eighth century writing-pens are mentioned by Alcuin, who at that period, in the time of Charlemagne, was of service in extending literary knowledge. He composed poetical inscriptions for every part of a monastery, among which there is one even for a privy,† and another for a writing-study. Speaking of the latter, he says that no one

---

dividitur in duo; in toto corpore unitate servata. *Origines*, lib. vi. 13. p. 132.

* His writings may be found in *Maxima Bibliotheca patrum.* Lugduni 1677, fol. tom. xiii. In p. 27, is the following poem on a pen:

De penna scriptoria.

Me pridem genuit candens onocrotalus albam
Gutture qui patulo sorbet in gurgite lymphas.
Pergo ad albentes directo tramite campos,
Candentique viæ vestigia cærula linquo,
Lucida nigratis fuscans anfractibus arva.
Nec satis est unum per campos pandere callem;
Semita quin potius milleno tramite tendit,
Quæ non errantes ad cœli culmina vexit.

The author does not speak here of a goose-quill, but of a pelican's, which at any rate may be as good as that of a swan.

† Ad latrinium (latrinam).

ought to talk in it, lest the pen of the transcriber should commit a mistake.*

After the above period proofs occur which place the matter beyond all doubt. Mabillon saw a manuscript of the gospels, which had been written in the ninth century under the reign of St. Louis, in which the evangelists were represented with quills in their hands. The same author mentions a like figure of the eleventh century.† In the twelfth century, Peter de Clugny, who by scholastic writers is called *Venerabilis*, and who died in 1157, wrote to a friend, exhorting him to assume the pen instead of the plough, and to transcribe, instead of tilling land.* In short, writing-quills are often called *calami* by ancient and modern authors who wrote good Latin; and it is probable that this word is employed by older writers than Isidore to signify writing-pens, where, for want of other proofs, we understand reeds.

---

* In the latest elegant edition, *Alcuini opera, cura* Frobenii, Ratisbonæ 1777, 2 vol. fol. ii. p. 211,

Ad museum libros scribentium.

Hic sedeant sacræ scribentes famina legis
  Nec non sanctorum dicta sacrata patrum.
Hæc interserere caveant sua frivola verbis,
  Frivola nec propter erret, et ipsa manus;
Correctosque sibi quærant studiose libellos,
  Tramite quo recto penna volantis eat.
Per cola distinguant proprios et commata sensus,
  Et punctos ponant ordine quosque suo;
Ne vel falsa legat, taceat vel forte repente,
  Ante pios fratres, lector in ecclesia.

† Extat in Altivillarensi agri Remensis monasterio veterrimus Evangeliorum codex, quem Petrus abbas ab annis fere nongentis, scilicet principatu Ludovici Pii, pontificatu Ebonis archiepiscopi, a Placido monacho litteris aureis eleganter exarari curavit; quo in codice depicti exhibentur quatuor Evangelistæ scribentium in morem, cum penna in manu, in quibusdam ex illis quatuor sic expressa, ut de pennæ usu in scribendo illis temporibus recepto non liceat dubitare. Vidimus et alium codicem Vitæ Sancti Amandi in Abbatia Elnonensi, ante annos circiter septingentos descriptum, in quo Bandemundus monachus, qui hanc Vitam ab annis mille composuit, cum penna itidem in manu repræsentatur. Similia alibi exempla videre licet. *De re diplomatica,* Lutetiæ Parisiorum 1709, fol. in supplemento, p. 51.

The poet Heerkens† has lately asserted, that the use of quills for writing is much older, and that the Romans became acquainted with them during their residence in the Netherlands, where they could not easily procure Egyptian reeds, and where, according to the account of Pliny,‡ they paid so much attention to the catching of geese. That writer, however, says, that this was done on account of the flesh of these animals, which they esteemed much when roasted, and of the softness of their feathers on which they were fond of sleep-ing. Heerkens himself remarks, that Pliny, had he known the use of quills for writing, would not have passed it over in silence, when he gives so circumstantial an account of writing-reeds. He is of opinion also, that, as the Dutch terms of art which allude to writing, such as *schryſpen*, &c. are of Latin extraction, the Dutch must have acquired them as well as the things signified from the Romans. This however seems to afford very little support to his assertion. Of more importance is the observation that in an old and beautiful manuscript of Virgil, in the Medicean library, which was written soon after the time of Honorius, the thickness of the strokes, and the gradual fineness of the hair-strokes of the letters give us reason to conjecture, that they must have been written by some instrument equally elastic as a quill, as it is not probable that such strokes could be made with a stiff reed.* It is also certain, that the letters of the greater part of ancient manuscripts, particularly those found at Herculaneum, are written in a much stiffer and more uniform manner. But little confidence is to be placed in this observation; for we do not know but the ancient artists may have been acquainted with some method of giving elasticity to their reeds, and may have employed them in such a manner as to produce beautiful writing.

---

* Pro aratro convertatur manus ad pennam; pro exarandis agris, divinis literis paginæ exarentur. *Petr. Venerabil.* lib. i. ep. 20, ad *Gislebertum*. C. G. Schwarz, who quotes these words in *Exercit. de varia suppellectile rei librariæ veterum*, Altorfii 1725, 4to, § 8, ascribes them falsely to the venerable Bede, who died about the year 735.

† Ger. Nic. Heerkens Aves Frisicæ. Rotterodami 1788, 8vo. p. 106.

‡ Hist. Nat. lib. x. cap. 22.

---

* This manuscript was correctly printed by Pet. Franc. Foggjnius, in quarto, in 1741. A specimen of the writing is given p. 15. See the newest edition of Virgil by Mr. Heyne, in *Elenchus codicum*, p. 41.

Notwithstanding the great advantage which quills have over reeds for writing, the latter however seem to have continued long in use even with the former. This conclusion I do not form because *calamus* and *arundo* are to be found in the works of late writers; for many authors may have employed these old Latin words to express quills, like Cassiodorus, who in the sixth century, when exhorting the monks to transcribe theological works, used both these terms indiscriminately:* but I found my assertion on the testimony of diplomatists, and particularly on the undoubted mention made of writing-reeds in the sixteenth century.

Men of letters, well versed in diplomatics, assure us, from comparing manuscripts, that writing-reeds were used along with quills in the eighth century, at least in France, and that the latter first began to be common in the ninth. The papal acts, and those of synods, must however have been written with reeds much later.† In convents they were retained for text and initials, while, for small writing, quills were every where employed.‡

---

* Divin. lection. cap. xxx. p. m. 477, 478.

† Nouveau traité de diplomatique, par deux Benedictins. Paris 1750, 4to. vol. i. p. 537.

‡ Brower in his notes to *Hrabani Mauri Poemata*, Moguntiæ

I can allow little credit to a conjecture supported merely by a similarity of the strokes in writing, because it is probable that people at first would endeavour to write in as strong and coarse a manner with quills, as had been before done with reeds, in order that the writing might not seem much different from what was usual; and with quills one can produce writing both coarse and fine. Mr. Meiners, however, referred me to a passage in a letter of Reuchlin, which removes all doubt on the subject. When this worthy man, to whom posterity are so much indebted, was obliged to fly by the cruelty of his enemies, famine and the plague, and to leave behind him all his property, he was supplied with the most common necessaries by Pirkheimer.* Among other articles the latter sent to him, in the year 1520, writing materials, good paper, pen-knives, and, instead of peacocks-feathers which he had requested, the best swan-quills. That nothing might be wanting, he added also proper reeds, of so excellent a sort, that Reuchlin considered them to be Egyptian or Cnidian.†

1617, 4to. p. 122: Utriusque, et calami et pennæ, in monasteriis ad rituales libros et cantum ecclesiasticum celebrem usum viguisse, recordantur avi nostri.

* Reuchlin's life may be found in Meiners' Lebensbeschreibungen berühmter männer. Zurich 1795, 8vo. vol. i.

† Desideravi pavonum pennas, ut quandoque lecta describerem; tu me olorinis donasti plus quam egregiis: ac ne deesses officiosæ

These reeds at that period must have been scarce and in great request, as it appears by some letters of Erasmus to Reuchlin, for my knowledge of which I am under obligations to Mr. Meiners, that the former received three reeds from the latter, and expressed a wish that Reuchlin, when he procured more, would send some of them to a learned man in England, who was a common friend to both.*

Whatever may have been the cause, about the year 1433 writing-quills were so scarce at Venice, that it was with great difficulty men of letters could procure them. We learn at any rate, that the well-known Ambrosius Traversarius, a monk of Camaldule, sent from Venice to his brother, in the above year, a bunch of quills, together with a letter, in which he said, "They are not the best, but "such as I received in a present. Show the whole "bunch to our friend Nicholas, that he may select "a quill; for these articles are indeed scarcer in "this city than at Florence."† This Ambrosius

---

amicitiæ, calamos etiam Niloticos, vel, quod potius reor, Cnidios ad scribendum aptiores misisti; et gladiolos incisioni commodissimos. *Bilibaldi Pirkheimeri Opera*, Francof. 1610. fol. p. 259.

* Sensi illum avidissimum calamorum νειλωτων cujusmodi mihi tres donasti: proinde, si tibi sunt aliquot, nullum munus gratius mittere possis. *Illustrium virorum epistolæ ad Joannem Reuchlin missæ.* The following words stand at the end: Hagenoæ 1519, 4to. p. 144. The letter from which this extract is taken has no date.

† Mitto ad te calamorum fasciculum, non quidem optimorum,

complains likewise, that at the same period he had hardly any more ink, and requested that a small vessel filled with it might be sent to him.* Other learned men complain also of the want of good ink, which they either would not or did not know how to make. Those even who deal in it seldom know of what ingredients it is principally composed.

WIRE-DRAWING.

It is highly probable, that in early periods metals were beat with a hammer to thin plates or leaves, which were afterwards divided into small slips by means of a pair of scissars, or some other instrument; and that these slips were by a hammer and file then rounded, so as to form threads or wire. This conjecture seems to be confirmed by the oldest information respecting work of this kind.

---

sed quales mihi dono dati sunt. Nicolao nostro dabis seligendos, ut si quem ex eis elegerit, satisfecisse officio nostro vel ex parte videamur. Nam revera majorem in hac civitate hujusce rerum penuriam quam Florentiæ patimur. *Ambrosii Traversarii Epistolæ*, ed. L. Mehus. Florentiæ 1759, 2 vol. fol. ii. p. 566. In my opinion this complaint alludes only to the particular place where the author was. See the life of Ambrosius, in Meiners' *Lebensbeschreibungen berühmter männer*, ii. p. 306.

* Ibid. p. 580.

When the sacerdotal dress of Aaron was prepared, the gold was beaten and cut to threads, so that it could be interwoven in cloth.* We are told also that Vulcan, desirous to expose Mars and Venus, while engaged in their illicit amour, repaired to his forge, and formed on his anvil, with hammers and files, a net so fine that it could be perceived by no one, not even by the gods themselves, for it was as delicate as a spider's web.† These fine threads therefore were at that time first beat upon

---

* Exodus, chap. xxxix. ver. 3. Braun, in his work *De vestitu sacerdotum Hebræorum*, Amstelod. 1701, p. 173, says: Jarchius has translated these words as follows: Extendebant aurum instar bractearum tenuium, et ex iis scindebant filamenta, et nebant filamentum aureum cum byssino.

† Βη ρ᾽ ιμεν ες χαλκεωνα, κακα φρεσι βυσσοδομευων·
Εν δ᾽ εθετ᾽ ακμοθετῳ μεγαν ακμονα, κοπτε δε δεσμους
Αῤῥηκτους, αλυτους, οφρ᾽ εμπεδον αυθι μενοιεν.
Perrexit ire in officinam, mala animo profunde cogitans;
Imposuit autem incudis repositorio ingentem incudem, cudebatque vincula
Infrangibilia, insolubilia; ut firmiter illic manerent.
Αμφι δ᾽ αρ᾽ ἑρμισιν χεε δεσματα κυκλῳ απαντη·
Πολλα δε και καθυπερθε μελαθροφιν εξεκεχυντο,
Ηυτ᾽ αραχνια λεπτα, τα κ᾽ ου κε τις ουδε ιδοιτο
Ουδε θεων μακαρων· περι γαρ δολοεντα τετυκτο.
Circumfudit autem lecti fulcris vincula circulatim omni ex parte;
Multa autem et desuper e fastigio effusa erant,
Perinde atque araneæ fila tenuia, quæ nemo ne cerneret quidem
Neque deorum beatorum; perquam enim dolosa facta erant.

Homer. Odyss. lib. viii. 273, 278.

— — — — — — At illi
Et mens, et quod opus fabrilis dextra tenebat,
Excidit. Extemplo graciles ex ære catenas
Retiaque et laqueos, quæ lumina fallere possint,

the anvil, and afterwards rounded by a file, but were not drawn out like our wire. I do not remember to have found a single passage in ancient authors where mention is made of metal prepared by being wire-drawn. The *æs ductile* of Pliny was so called because it was malleable, and could be beat into thin leaves; and he says *tenuatur in laminas.*[*] In my opinion, works made with threads of metal occur too seldom in the writings of the ancients, to allow us to suppose that they were acquainted with that easy and cheap method of forming these threads by wire-drawing. Wire-work is rarely mentioned, and wherever it is spoken of, it appears to have been prepared on the anvil.

Such threads of the dearest and most malleable metal, gold, seem to have been early employed for ornamenting different articles of dress, but certainly not in so ingenious and beautiful a manner as in modern times. It is probable that slips of gold were sewed upon clothes, and particularly on the seams, as is still practised with lace; and perhaps gold stars and other figures cut from thin plates of gold were applied to dresses in the same manner,

---

Elimat. Non illud opus tenuissima vincant
Stamina, non summo quæ pendet aranea tigno.
Utque leves tactus, momentaque parva sequantur,
Efficit; et lecto circumdata collocat apte.

Ovid. Metamorph. lib. iv. 174.

I had much rather Burmann had considered a little more, and not changed *elimat* into *eliquat.*

[*] Lib. xxxiv. cap. 8.

as is the case at present with spangles, and perhaps they were only affixed to them with paste. People however soon began to weave or knit dresses entirely of gold threads, without the addition of any other materials; at least such seems to be the account given by Pliny.* Of this kind was the mantle taken from the statue of Jupiter by the tyrant Dionysius,† and the tunic of Heliogabalus mentioned by Lampridius.‡ These consisted of real *drap d'or*, but the moderns give that name to cloth the threads of which are silk wound round with silver wire flattened and gilded.

The invention of interweaving such massy gold threads in cloth is by Pliny ascribed to king Attalus: but I consider it to be much older, though I have found no certain proofs to support this opinion. I conjecture that the cloth of Attalus, so much extolled on account of its magnificence, was embroidered with the needle; for in the passage where embroidery is mentioned by Pliny for the first time, he speaks of its being invented by the Phrygians; he then mentions the cloth of Attalus; and immediately after the Babylonian, which, as is proved by several expressions in ancient authors, was certainly embroidered with the needle. * If I am not mistaken, Attalus first caused woollen cloth to be embroidered (not interwoven) with threads of gold; and the doubt that Pliny assigns too late a period to the interweaving

---

* Lib. xxxiii. cap. 4: Vidimus Agrippinam indutam paludamento, aureo textili sine alia materie.—Aldrovandus relates, in his *Museum metallicum*, that the grave of the wife of the emperor Honorius was discovered at Rome about the year 1544, and that thirty-six pounds of gold were procured from the mouldered dress which contained the body.

† Cicero de nat. deor. iii. 34, 83. Valer. Max. i. 1. exter. § 3: Detracto Jovi magni ponderis aureo amiculo - - - injectoque ei laneo pallio; dixit, æstate grave amiculum esse, hieme frigidum; laneum autem ad utrumque tempus anni aptius.

‡ Lamprid. Vita Heliogab. cap. 23: Usus est aurea omni tunica. *A tunic entirely of gold.*

---

* Acu facere id Phryges invenerunt, ideoque Phrygioniæ appellatæ sunt. Aurum intexere in eadem Asia invenit Attalus rex; unde nomen Attalicis. Colores diversos picturæ intexere Babylon maxime celebravit. *Plin.* lib. viii. cap. 48. That the cloth of Attalus was embroidered with the needle is proved by a passage of *Silius Italicus,* lib. xiv. 661:

> - - - - - - Quæque Attalicis variata per artem
> Aulæis scribuntur acu.———

We find by Martial, lib. xiii. ep. 28, that the Babylonian cloth was also ornamented with embroidery:

> Non ego prætulerim Babylonica picta superbe
> Texta, Semiramia quæ variantur acu.

The same author, lib. xiv. ep. 50, extols the weaving of Alexandria, as being not inferior to the Babylonian embroidery with the needle.

> Hæc tibi Memphitis tellus dat munera; victa est
> Pectine Niliaco jam Babylonis acus.

In opposition to the above might be quoted only one passage of Tertullian *De habitu mulierum,* where he makes use of the word *insuere* to the Phrygian work, and of *intexere* to the Babylonian. By these expressions it would appear that he wished to define accurately the difference of the Phrygian and Babylonian cloth, and to show that the former was embroidered and the latter wove. But Tertullian often plays with words. *Intexere* is the same as *insuere.* In Pliny, book xxxv. ch. 9, a name embroidered with gold threads is called *aureis litteris in palleis intextum nomen.*

cloth with threads of gold is entirely removed. It appears that in the third century gold was interwoven with linen, that linen was embroidered with gold threads, or that gold threads were sewed upon linen, which the emperor Alexander Severus considered as folly; because by these means the linen was rendered stiff, cumbersome, and inconvenient.*

It was not till a much later period that silver began to be formed into threads by a like process, and to be interwoven in cloth. Saumaise and Goguet † have already remarked that no mention of silver stuffs is to be found in the works of the ancients; for the passages which might be quoted from Homer speak only, without doubt, of white garments.‡ Pliny certainly would not have omitted this manner of preparing silver, had it been usual in his time; especially as he treats so expressly of that metal, and its being employed for ornaments, and speaks of gold threads and embroidering with gold. Vopiscus, however, seems to afford us an indubitable proof that silver thread was not known in the time of the emperor Aurelian. § This author informs us that the emperor was desirous of entirely abolishing the use of gold for gilding and weaving, because, though there was more gold than silver, the former had become scarcer, as a great deal of it was lost by being applied to the above purposes, whereas every thing that was silver continued so;* but it has been fully proved by Saumaise that silver threads were interwoven in cloth in the time of the last Greek emperors.†

---

* In linea aurum mitti dementiam judicabat, cum asperitati adderetur rigor. *Lamprid. Vita Alexand. Severi,* c. 40.

† Vom Ursprunge der Gesetze und Künste, ii. p. 99.

‡ Odyss. lib. v. 230. x. 23, 24.

§ Habuit in animo ut aurum neque in cameras, neque in tunicas, neque in pelles, neque in argentum mitteretur, dicens plus auri esse

The period when attempts were first made to draw into threads metal cut or beat into small slips, by forcing them through holes in a steel plate placed perpendicularly on a table, I cannot determine. In the time of Charlemagne this process was not known in Italy; for however unintelligible may be the directions given in Muratori‡ *de fila aurea facere, de petalis auri et argenti*, we learn from them that these articles were formed only by the hammer. It is extremely probable

---

in rerum natura quam argenti; sed aurum per varios bractearum, filorum et liquationum usus perire, argentum autem in suo usu manere. *Vita Aureliani*, cap. 46.

* To speak the truth, a doubt arises respecting this proof. It is possible that the author here speaks of gilt silver; for, as the ancients were not acquainted with the art of separating these metals, their gold was entirely lost when they melted the silver. I remember no passage, however, in ancient authors where mention is made of weaving or embroidering with threads of silver gilt.

† Salmas. ad Vopisc. p. 394; et ad Tertull. de pallio, p. 208. Such cloth, at those periods, was called συρματινον, συρματηρον, drap d'argent.

‡ Antiquitat. Ital. medii ævi, ii. p. 374.

that the first experiments in wire-drawing were made upon the most ductile metals; and that the drawing of brass and iron to wire is of later date. It is likewise certain that the metal was at first drawn by the hand of the workman; in the same manner as wire is drawn by our pin-makers when they are desirous of rendering it finer. They wind it off from one cylinder upon another, by which means it is forced through the holes of the drawing-iron; and this process agrees perfectly with the description of Vannuccio* and Garzoni,† as well as with the figures in the German translation of the latter.

As long as the work was performed by the hammer, the artists at Nuremberg were called wire-smiths; but after the invention of the drawing-iron they were called wire-drawers, and wire-millers. Both these appellations occur in the history of Augsburg so early as the year 1351;‡ and in that of Nuremberg in 1360;§ so that, according to the best information I have been able to obtain, I must class the invention of the drawing-iron, or proper wire-drawing, among those of the fourteenth century.

---

* Pyrotechnia, lib. ix. cap. 8.

† La piazza universale. In Venetia 1610, 4to. p. 390.

‡ Von Stetten, in Kunstgeschichte der stadt Augsburg, i. p. 223.

§ Von Murr, in Journal zur Kunstgeschichte, v. p. 78. To this author we are indebted for much important information respecting the present subject.

At first, threads exceedingly massy were employed for weaving and embroidering. Among the ruins of Herculaneum were found massy gold tassels, the threads of which were wound neither round silk nor any other materials.* It would be of some importance if one could determine the period when flatted metal wire began to be spun round linen or silk thread, by which improvement various articles of dress and ornament are rendered more beautiful as well as cheaper. The spinning-mill, by which this labour is performed at present, is so ingeniously contrived that the name of the inventor deserves to be made immortal.†

It appears that the wire first spun about thread was round; and the invention of previously making the wire flat is, in my opinion, a new epoch in the history of this art. Three times as much silk can be covered by flatted as by round wire; so that tassels and other articles become cheap in proportion. Besides, the brightness of the metal is heightened in an uncommon degree; and the article becomes much more beautiful.‡ The wire is flatted at present by means of a flatting-mill, which consists of two steel cylinders, put in motion by a handle, and as the wire passes through between them it is compressed and rendered flat. The management of these cylinders requires a dexterity which only a few artists possess; and this seems to show that the machine is still in its infancy. These cylinders were at first procured from the Milanese, and afterwards from Schwarzenbruck in Saxony; but since the death of the artists in those parts who were acquainted with the secret of making them, they have generally been ordered from Neufchatel. A pair of them cost two hundred dollars. The whole art, however, seems to consist in giving a proper hardness to the steel and in polishing them. In the earliest ages, wire was flatted with a hammer on the anvil; and the broad slips were cut into small threads by women with a pair of scissars. The process is thus described by Vannuccio and Garzoni, without mentioning the flatting-mill which is now used for brass work, coining money, and various other purposes.

---

* Bjornstahls Briefe, i. p. 269.

† See a description of it in *Sprengels Handwerken und künsten*, iii. p. 64; or in the tenth volume of the plates belonging to the *Encyclopédie*, under the article *Tireur et fileur d'or*.

‡ Bericht von gold- und silber-dratziehen; von Lejisugo. Lubeck 1744, 8vo. p. 199.

Before I proceed to the newest inventions I shall add the following observations. Of the wire-work of the ancients we have very few remains, and these are to be found upon cast statues, on which one cannot expect any fine wire spun or entwisted round other substances, even supposing that they had such. In the museum at Portici, which contains a variety of articles discovered at Herculaneum, there are three metal heads, with locks in imitation of hair. One of them has fifty locks made of wire as thick as a quill, bent into the form of a curl. On the other the locks are flat like small slips of paper which have been rolled together with the fingers, and afterwards disentangled.* A Venus, a span in height, has on the arms and legs golden bracelets † (*armillæ et periscelides*), which are formed of wire twisted round them. Grignon found in the ruins of a Roman city in Champagne a piece of gold thread which was a line in thickness.‡ Among the insignia of the German empire is the sword of St. Maurice, the handle of which is wood bound round with strong silver wire.§ The ancients, however, must have been acquainted at an early period with the art of making gold wire of considerable fineness, as they used it in weaving, and for embroidery. When surgeons were desirous to fasten a loose tooth, or to implant one of ivory in the room of one that had dropped out, they bound it to the next one by a piece of fine gold wire. ||

---

* J. Winkelmann, Sendschreiben von den Herculanischen entdeckungen. Dresden 1762, 4to. p. 36.

† Winkelmann, ibid. p. 38.

‡ Second bulletin des fouilles d'une ville Romaine, par Grignon. Paris 1775, 8vo. p. 111. Nous avons trouvé un petit bout d'ortrait d'une ligne de diametre et de trois lignes de longueur.

§ Von Murr, Beschreibung der Merkwürdigkeiten in Nürnberg, 1778, 8vo. p. 229.

|| Some explain the following words in the twelve tables of the Roman laws: *Cui auro dentes vincti sunt,* as alluding to this circumstance. Funke however does not admit of this explanation,

The greatest improvement ever made in this art was undoubtedly the invention of the large drawing-machine, which is driven by water, and in which the axle-tree, by means of a lever, moves a pair of pincers, that open as they fall against the drawing-plate; lay hold of the wire, which is guided through a hole of the plate; shut as they are drawn back: and in that manner pull the wire along with them.* What a pity that neither the inventor

---

because he does not believe it possible to bind a tooth in that manner. *Leges duodecim tabularum illustratæ* a J. N. Funcio. Rintelii 1774, 4to. p. 462. It has, nevertheless, been sufficiently confirmed both by ancient and modern physicians. *Celsus, de medicina,* lib. vii. cap. 12: Si ex ictu vel alio casu aliqui labant dentes, auro cum his qui bene hærent vinciendi sunt. Compare with the above *Hippocrates de articulis,* fol. 1595, sect. 6, p. 68, 70. *C. G. Ludwig, Institutiones chirurgicæ,* Lipsiæ 1764, 8vo. p. 323.

* A description of this excellent machine may be found in *Sprengels Handwerken,* iv. p. 208; *Cancrinus Beschreibung der vorzüglichsten bergwerke,* Frankf. 1767, 4to. p. 128; in the tenth volume of the plates to the *Encyclopédie,* under the article *Tireur et fileur d'or*; in *der Pariser kunsthistorie,* and other works. Mr. von Murr quotes a very ingenious description of it by the well-known poet Eobanus Hessus, who died in 1540, which I shall here insert. It stands in *Urbs Norimberga,* 1532.

Namque quis aspiciens quanta se mole rotarum
Volvat opus, quanta ferrum vi distrahat ut sit
Perfectum ingenio, jam possit ut unus et alter
Quod non mille viri poterant nondum arte reperta.
Ista videns quis non miretur? et omnia retro
Sæcula desidiæ damnet, qui talia nunquam
Cognorint nostrorum hominum præclara reperta?
Magna rota ingentem vi fluminis acta cylindrum
Fert secum, volvitque rotans, pars ultima cujus
Dentibus armata est crebris, qui fortiter acti

nor the time when this machine was invented is known! It is, however, more than probable that it was first constructed at Nuremberg by a person named Rudolf, who kept it long a secret; and by these means acquired a considerable fortune. Conrade Celtes, who wrote about the year 1491, is the only author known at present, who confirms this information; and he tells us that the son of the inventor, seduced by avaricious people, discovered to them the whole secret of the machinery; which so incensed the father, that he would have put him to death, had he not saved

Obstantes sibi machinulas rapiuntque feruntque,
Ni rapiant remoraturos ipsosque rotamque
Undasque gravidumque ingenti mole cylindrum.
Ergo ubi vi tanta correpta est machina pendens
Inferius, molem supra movet ocyus omnem,
Instrumenta regens, quibus atri lamina ferri
Scinditur, et varios rerum tenuatur in usus,
Nunc has, nunc alias aptas assumere formas,
Vi nempe indomita jussu parere coacta.
Ferrea nam videas capita assimulata dracones,
Alterum alterius morsu divellere ferrum
Dentibus; hic retinet, massam trahit ille draconum.
Ac hoc dum faciunt, ita se perniciter urgent,
Certantes crebris inter se assultibus, ac si
Pro vita non pro ferro certatur utrimque:
Atque ita dum rapidis ferrum rude morsibus arcent,
In filum teres expoliunt, quod ab ore receptum
Vipereo, adsistens in mille volumina curvat.
Quis Deus hanc, quis tam memorabilis artem
Ostendit casus? Non ille aut Thracius, aut Cres,
Aut Italus fuit, ingenio qui claruit illo,
Unde hanc humanis concesserit usibus artem;
Sed Germanus erat, sed Noricus, &c.

himself by flight.* Mr. von Murr, however, has not been able to find any proofs of this circumstance; and amongst the names of wire-drawers, which he met with in the records of Nuremberg, it appears that there must have been no Rudolf, else he would certainly have mentioned it. Doppelmayer,† from mere conjecture, places Rudolf's invention in the year 1400; but Mr. von Murr makes it older, because he found in the year 1360 the name Schockenzier, which signifies a person who works at wire-drawing.

This art, it appears, was brought to the greatest perfection at Nuremberg. Several improvements were from time to time found out by different persons, who turned them to their advantage, and who received exclusive patents for using them, sometimes from the emperor, and sometimes from the council, and which gave occasion to many tedious law-suits. We have, however, reason to believe that the finer kinds of work, particularly in gold and silver, were carried on with great success, above all, in France and Italy; and that many improvements were brought from these countries to Germany. I have not materials sufficient to enable me to give a complete account of the progress of the art of wire-drawing at Nuremberg; but it affords me pleasure that I can communicate some important information on this subject, which was published* by Dr. F. C. G. Hirsching of Erlangen, taken from original papers respecting the wire-drawing manufactory at Nuremberg,† and which I shall here insert.

---

* This account may be found vol. i. p. 197 of the before-quoted work, *Urbis Norimbergæ descriptio*, Hagenoæ 1518, fol. cap. 5. Ferunt ibi primum artem extenuandi ducendique radii per rotarum labores inventam a quodam Rudolfo, qui dum artem velut arcanum occultaret, magnasque ex ea divitias conquireret, ob hoc cæteris civibus, quemadmodum usu venit in lucrosis proventibus, maxime apud auctionarios, inquirendæ ejus artis cupidinem injecisse, qui filium ejus induxerant et corruperant, ut interiorum rotularum labores et tenellas, quæ ferream bracteolam per angustum foramen prendunt, sicque pertinaciter trahendo extenuant, archetypo aliquo exprimeret; quod factum dum pater comperit, velut in insaniam et furorem actus, filium trucidare statuisse ferunt, nisi se ille aspectui suo subtraxisset, manibusque elapsus, abfugisset.

† Nachricht von Nürnbergischen künstlern, p. 281.

In the year 1570, a Frenchman, named Anthony Fournier,‡ first brought to Nuremberg the art of drawing wire exceedingly fine, and made considerable improvement in the apparatus used for that purpose. In 1592 Frederick Hagelsheimer, called also Held, a citizen of Nuremberg, began to prepare, with much benefit to himself, fine gold and silver wire, such as could be used for spinning round silk and for weaving, and which before that period had been manufactured only in Italy and France. Held removed his manufactory from France to Nuremberg, and received from the magistrates an exclusive patent, by which no other person was allowed to make or to imitate the fine works which he manufactured, for the term of fifteen years. On account of the large capital and great labour which was required to establish this manufactory, his patent was by the same magistrates continued in 1607 for fifteen years more.

---

* In the Journal des Freyherrn von Bibra.

† Journal von und für Teutschland, 1788, achtes stück, p. 102.

‡ Mr. von Murr says in his Journal, v. p. 88, that in the 17th century John Fournier, at Freystadtlein, six miles from Nuremberg, and in Nuremberg Frederick Held, of the ancient family of Hagelsheimer, were the first persons in Germany who raised themselves and acquired great riches by a manufactory for flatted gold and silver wire.

As this patent comprehended only fine work, and the city of Nuremberg, and as works of copper gilt with silver or gold were of great importance, he obtained on the 19th of March 1608, from the emperor Rodolphus II, an extension of his patent, in which these works were included, and by which power was granted to him to seize, in any part of the Empire, as well as in Nuremberg, imitations of his manufactures made by others, or such of his workmen as might be enticed from his service.—A prolongation of his patent for fifteen years was again granted to him, at the same time.

After the death of the emperor Rodolphus, his patent was in every thing renewed, on the 29th of September 1612, by the emperor Matthias, and extended to the term of fifteen years more. On the 16th of June 1621, the Nuremberg patent expired; and the same year the family of Held, with consent of the magistrates of that city, entered into an agreement, in regard to wages and other regulations, with the master wire-drawers and piece-workers,* which was confirmed in another patent granted to Held on the 28th of September 1621, by the emperor Ferdinand II, agreeably to the tenor of the two patents before mentioned, and which was still continued for fifteen years longer. On the 26th of September 1622 this patent, by advice of the imperial council, and without any opposition, was converted into a fief to the heirs male of the family of Held,† renewable at the expiration of the term specified in the patent.

It appears that in the fifteenth century, there were flatting-mills in several other places as well as at Nuremberg. In the town-books of Augsburg there occurs, under the year 1351, the name of a person called *Chunr. Tratmuller de Tratmul*; who certainly seems to have been a wire-drawer. In 1545, Andrew Schulz brought to that city the art of wire-drawing gold and silver, which he had learned in Italy. Before this period that art was little known in Germany; and Mr. von Stetten mentions an Imperial police ordinance of the year 1548, in which gold fringes are reckoned among those wares for which large sums were at that time sent out of the Empire. Schulz obtained a patent from the council, but his attempt proved unsuccessful. The business, however, was undertaken afterwards in Augsburg by others, and in particular by an opulent mercantile family named Hopfer, who bestowed great pains to establish it on a permanent footing. For this purpose they invited from Venice, Gabriel Marteningi and his son Vincent, who were excellent workmen and had great experience in the art. George Geyer, who learned under them, was the first person who introduced the flatting of wire at Augsburg; and he and his son endeavoured for a long time to monopolize the employment of wire-drawing, and to prevent other people from engaging in it near them. In the year 1698 M. P. Ulstatt, John George Geyer, Joseph Matti and Moriz Zech obtained a new patent, and out of gratitude for this favour they caused a medal to be struck, which deserves to be reckoned among the most beautiful works of Philip Henry Muller, the artist who cut the die.

---

* Piece-workers were such masters as were obliged to work privately by the piece: because, according to the imperial patent, no one except Held or those whom he permitted durst carry on this business. For this permission it was necessary to pay a certain sum of money.

† The family at this period consisted of Frederick Held and his three sons Bartholomew, Frederick, and Paul.

In the year 1447 there was a flatting-mill at Breslau; * and another, together with a burnish-

---

* Von Breslau, Documentirte geschichte, ii. 2. p. 409.

ing-mill was constructed at Zwickau[*] in 1506. All the wire in England was manufactured by the hand till 1565, when the art of drawing it with mills was introduced by foreigners.[†] Before that period the English wire was bad; and the greater part of the iron-wire used in the kingdom, as well as the instruments employed by the wool-combers, was brought from other countries. According to some accounts, however, this art was carried to England at a much later period; for we are told that the first wire-making was established at Esher by Jacob Momma and Daniel Demetrius.[‡] Anderson himself says that a Dutchman constructed at Sheen, near Richmond, in 1663, the first flatting-mill ever seen in England.[§]

Iron-wire in France is called *fil d'Archal;* and the artists there have an idea, which is not improbable, that this appellation took its rise from one Richard Archal, who either invented or first established the art of drawing iron-wire in that country. The expression *fil de Richard* is therefore used also among the French wire-drawers.[‖] Of this Archal, however, we know as little as of the Nuremberg Rudolf; and Menage will not admit the above derivation. He is of opinion that *fil d'Archal* is compounded of the Latin words *filum* and *aurichalcum.**

---

[*] Chronica Cygnæa, oder Beschreibung der stadt Zwickau; durch Tob. Schmidten. Zwickau 1656, ii. p. 254.

[†] Anderson's Geschichte des handels, iv. p. 101.

[‡] Husbandry and trade improved, by John Houghton. London 1727, 8vo. ii. p. 188.

[§] Anderson, v. p. 484.

[‖] Dictionnaire de commerce, par Savary, ii. p. 599. Dictionnaire des origines, par D'Origny, ii. p. 285.

To conclude this article, I shall add a few observations respecting filigrane works and spangles. The first name signifies a kind of work of which one can scarcely form a proper idea from a description. Fine gold and silver wire, often curled or twisted in a serpentine form, and sometimes plaited, are worked through each other and soldered together so as to form festoons, flowers and various ornaments; and in many places also they are frequently melted together by the blow-pipe into little balls, by which means the threads are so entwisted as to have a most beautiful and pleasant effect. This work was employed formerly much more than at present in making small articles, which served rather for show than for use; such as needle-cases, caskets to hold jewels, small boxes, particularly shrines, decorations for the images of saints and other church furniture.† Work of this kind is called *filagrame*, *filigrane*, *ouvrage de filigrane;* and it may be readily perceived that these words are compounded of *filum* and *granum*. We are told in the *Encyclopédie* that the Latins called this work *opus filatim elaboratum:* but this is to be understood as alluding to the latest Latin writers; for *filatim* occurs only once in Lucretius, who applies it to woollen thread.

---

* Dictionnaire étymologique, i. p. 593. The author quotes the following passage from a French bible printed at Paris in 1544: Ne ayes pas merveilles, si tu lis en aucuns lieux à la fois, que ces choses estoient d'airain, et à la fois arcal; car airain et arcal est un mesme metal.

† Some account of this work may be found in *Halle's Werkstate der künste*, i. p. 101; and *Jacobson's Technologisches Wörterbuch*, i. p. 721.

This art, however, is of great antiquity, and appears to have been brought to Europe from the East. Grignon informs us that he found some remains of such work in the ruins of the Roman city before-mentioned.* Among church furniture we meet with filigrane works of the middle ages. There was lately preserved in an abbey at Paris, a cross ornamented with filigrane work, which was made by St. Eloy, who died in 665; and the greater part of the works of that saint are decorated in the like manner.† In the collection of relics at Hanover is still to be seen a cross embellished with this kind of work, which is said to be as old as the eleventh or twelfth century.‡ The

---

* Bulletin des fouilles d'une ville Romaine, i. p. 22: Une piece en filigrane, sous la forme d'une sphere applatie, ayant un trou circulaire au centre; elle est composée de fils de laiton, tors et unis entre eux, comme les mailles d'un reseau.

† Menage, Dictionnaire étymologique, i. p. 593.

‡ J. H. Jungii Disquisit. de reliquiis; accedit Lipsanographia sive Thesaurus reliquiarum electoralis Brunsuico-Luneburgicus. Hanoveræ 1783, 4to. p. 19, 29, 56. Of some articles there are figures.

Turks, Armenians and Indians make at present master-pieces of this sort, and with tools exceedingly coarse and imperfect. Marsden extols the ingenuity of the Malays on the same account;* and articles of the like nature, manufactured at Decan, are, we are told, remarkably pretty, and cost ten times the price of the metal employed in forming them.† This art is now neglected in Europe, and little esteemed. Augsburg, however, a few years ago had a female artist, Maria Euphros. Reinhard, celebrated for works of this kind, who died in 1779. In 1765 she ornamented with filigrane work some silver basons, which were sent to Russia for the use of the church, and which gained her great honour.‡

Spangles, *paillettes*, are small, thin, round leaves of metal, pierced in the middle, which are sewed on as ornaments; and though they are well known, it might be difficult for those who never saw them manufactured, or read an account of the manner in which they are prepared, to conceive how they are made. The wire is first twisted round a rod into the form of a screw; it is then cut into single spiral rings, like those used by pin-makers in forming heads to their pins; and these rings being placed upon a smooth anvil are flatted by a smart stroke of the hammer, so that a small hole remains in the middle, and the ends of the wire which lie over each other are closely united. I remember to have seen on old saddle-cloths and horse-furniture large plates of this kind; but the small spangles seem to be of later invention. According to Lejisugo,* whose real name I do not know, they were first made in the French gold and silver manufactories, and imitated in Germany, for the first time, in the beginning of the 17th century. The method of preparing them was long kept a secret.

---

* The history of Sumatra. London 1783, 4to. p. 145.

† Der Mistress Kindersley Briefe von der Insel Teneriffa und Ostindien. Leipzig 1777, 8vo. The jesuit Thomans praises the negroes of Monomotapa on the same account. See his Reise und Lebensbeschreibung. Augsburg 1788, 8vo.

‡ Von Stetten, Kunstgeschichte, i. p. 489, and ii. p. 287.

BUCK-WHEAT.

Grasses alone, and of these those only the seeds of which are so abundant in an eatable farinaceous substance that they deserve to be cultivated as food to man, are properly corn. Notwithstanding this definition, buck-wheat, which belongs to a kind of plants that grow wild in Europe, knot-grass, water-pepper, &c. because it is sown and employed like corn, is commonly reckoned to be corn also. Our wheat and oats, however, were not produced from indigenous grasses, as has been the opinion of some learned naturalists, who, nevertheless, were not botanists; nor has buck-wheat been produced from the above-mentioned wild plants.* Both these assertions can be proved by the strongest botanical evidence; and the latter is supported by historical testimony, which cannot be adduced in regard to the proper species of corn, as they were used before the commencement of our history.

---

* Bericht von Dratziehen, p. 192.

Two centuries ago, when botanists studied the ancients, and believed that they had been acquainted with and given names to all plants, some of them maintained that buck-wheat was their *ocimum*: others have considered it as the *erysimum* of Theophrastus; and some as the *panicum* or *sesamum*. All these opinions, however, are certainly false. It is indeed difficult to determine what plant the *ocymum* of the ancients was; but it may be easily proved that it was not buck-wheat, as Bock or Tragus† has confidently asserted. The

---

* It cannot however be denied that some indigenous grasses might be brought by culture, perhaps, to produce mealy seeds that could be used as food. It is at any rate certain that some grasses, for example the slender-spiked cock's-foot panic-grass, *panicum sanguinale*, which we have rooted out from many of our gardens, was once cultivated as corn, and is still sown in some places, but has been abandoned for more beneficial kinds. This plant may have been produced from some indigenous species of the buck-wheat.

† "If the learned would lay aside disputing, and give place to truth, they would be convinced, both by the sight and the taste, that this plant (buck-wheat) is the *ocymum* of the ancients." *Kreuterbuch*, Augsburg 1546, fol. p. 248.

ocimum, or a species of that name, for it seems to have been applied to several vegetable productions, was a sweet-smelling plant, called also, at least by later writers, *basilicum;*[*] one kind of *ocimum* had a thick, woody root,[†] and others possessed a strong medicinal virtue.[‡] The ancient writers on agriculture give it a place between the garden flowers and the odoriferous herbs;[§] but none of these descriptions can be applied to our buck-wheat, which is both insipid and destitute of smell. Two unintelligible passages of an ancient writer on husbandry make *ocimum* to have been a plant used for fodder, or rather a kind of green fodder or meslin composed of various plants mixed together.[‖] The *erysimum* of Theophrastus produced seeds which had a very hot acrid taste;[¶] and he doubts whether it was eaten by cattle.[**] Pliny says expressly that it ought to be classed rather among medicinal plants than those of the corn-kind;[††] though Theophrastus has mentioned it more than once among the latter.

---

[*] Hesychius: Ωκιμον. Βοτανη ευωδης το λεγομενον Βασιλικον.

[†] Theophrast. Hist. plant. lib. vii. cap. 3.

[‡] Dioscor. lib. ii. cap. 171.

[§] Geopon. lib. ix. cap. 28.

[‖] Varro, lib. i. cap. 31. That a kind of meslin is here to be understood, has been supposed by Stephanus, in his *Prædium rusticum*, p. 493; and Matthiolus is of the same opinion. See *Matthioli Opera*, p. 408. Buck-wheat may have been employed green as fodder; and it is indeed often sown for that use; but there are many other plants which can be employed for the like purpose.

[¶] Dioscorid. lib. ii. cap. 188.

[**] Theophrast. ed. Stap. p. 941.

[††] Plin. lib. xviii. cap. 10. Medicaminibus annumerandum potius quam frugibus. He says in the same place, and also p. 291,

It is not worth the trouble to enter into an examination of more opinions of the like kind, as several respectable writers, who lived in the beginning of the sixteenth century, consider buck-wheat to be a plant first introduced into Europe in their time, though they are not all agreed in determining its native country. John Bruyerinus, or, as he was properly called, La Bruyere-Champier, physician to Francis I, king of France, who in the year 1530 wrote his book, often printed, *De re cibaria*,*

---

that the *erysimum* was by the Latins called also *irio*; and hence it is that Ruellius and other old botanists give that name to buck-wheat.

* The first edition was published in octavo, at Lyons, in 1560. Two editions I have now before me; the first is called *Dipnosophia seu Sitologia. Esculenta et poculenta quæ cuivis nationi, homini, sexui, sanis, ægris, senibus, juvenibus, idonea vel minus usu probata, complectens omnia.* Auctore Joanne Bruyerino Campegio Lugdunensi. *Revisa, emaculata, duplicique indice locupletata* ab Othone Casmanno. E. S. Francofurti, 1606, 8vo. What Casmann did to this edition I cannot discover: perhaps he corrected the errors of the press. The preface even is not written by him, but by Peter Uffenbach, doctor of physic at Franckfort, who calls this edition *tertia omnibus mendis castigata.* The other is entitled *Joan. Bruyerini Cibus medicus, sive de re cibaria libri viginti duo, omnium ciborum genera, omnium gentium moribus et usu probata, complectentes.* Norimbergæ, 1659, 8vo. The author's preface, which is wanting in the first edition, is in this given. In both, the pages run the same, but the latter has not the index which is added to that of 1606. The author says in the end, that he gave his book to be printed in 1560, but that it was written thirty years before. He was a grandson of Symphorien Champier, whose works are men-

says that buck-wheat had been first brought to Europe a little before that time from Greece and Asia. That well-known botanist Ruellius,* who wrote in 1536, and Conrade Heresbach, † who died in 1576, give the same account. The latter calls the northern part of Asia the original country of this plant, or that from which it had a little before been brought to Germany. A nobleman of Brittany,

---

tioned in Haller's *Biblioth. botan.* i. p. 246. The passage alluded to may be found lib. v. cap. 23: Serunt Gallici rustici frugem aliam non ita pridem e Græcia, Asiave, aliove orbe ad nos invectam, folio hederaceo, sanguineum repræsentante colorem. Scapo grandis per fastigium paniculas exserente, triangulis rariuscule coacervatis gravis (*granis?*), quæ foliaceis membranis concepta detinentur. Vulgus Turcicum frumentum nominat. Nonnulli in caritate annonæ panes ex eo fingunt. Pinsitum certe candoris eximii reddit farinam. Sed in primis pecori majori minorique gratissimum est; ejusque usu mire sagina gliscit. Scio a quibusdam Lugdunensibus satum in agro Delphinate, Villurbano dicto, et feliciter erupisse. Certum est, columbis quoque esse jucundissimum. Belloiocenses quoque, Lugdunensibus vicini, feliciter serunt, eoque panificia sua augent.

* *De natura stirpium*; Basiliæ 1543, fol. p. 324: Rura nostra serunt frugem in agris folio hederaceo, sanguineum colorem præferente, scapo grandi per fastigium paniculas exerente, triangulis rariuscule coacervatis granis, quæ foliaceis membranis concepta detinentur. Hanc, quoniam avorum nostrorum ætate e Græcia vel Asia venerit, Turcium frumentum nominant. *It may be easily seen that Ruellius has copied La Bruyere-Champier, and from his account we may rectify some errors of the press in the latter.*

† Frumentum hoc non ita pridem e Sarmatiæ septemtrionalibus oris in Germaniam advectum, jam in frequenti usu, et suibus saginandis et pultibus faciendis, aliisque frumentis deficientibus, cum annonæ premit penuria, et cervisiæ et pani conficiendo plebi usurpatur. *Rei rusticæ libri quatuor.* Spiræ Nemetum 1595, 8vo. p. 120. He calls it triticum faginum, φαγοπυρον, or nigrum triticum, buck-wheat.

whose book *Les contes d'Eutrapel** was printed after his death in 1587, remarks occasionally, that at the time when he wrote, buck-wheat had been introduced into France about sixty years, and that it had become the common food of the poor. Martin Schook † wrote in 1661, that buck-wheat had been known in Flanders scarcely a hundred years. The old botanists, Lobelius, the brothers Bauhin, Matthiolus, and others, all assert, that this grain was new in Europe.‡ I shall here remark, that Crescentio, who lived in the thirteenth century, and described all the then known species of corn, makes no mention of buck-wheat. It undoubtedly acquired this name from the likeness which its seeds have to the fruit of the beech-tree; § and in my opinion, another name, that of

---

* Le Grand d'Aussy quotes from this book in his *Histoire de la vie privée des François*, i. p. 106, the following words: Sans ce grain, qui nous est venu depuis soixante ans, les pauvres gens auraient beaucoup à suffrir. Of the work, according to the French manner, he gives no account. *Eutrapel* is only a fictitious name—Ευτραπελος.

† *Martini Schookii Liber de cervisia.* Groningæ 1661, 12mo. p. 52: Frumentum hoc vix ante centum annos notum fuit Belgio, sed e Sarmatiæ septemtrionalibus oris advectum, mox cœpit esse in frequenti usu, et non modo pultibus faciendis, sed cervisiæ servire cœpit. *Almost the words of Heresbach.*

‡ Lobelii Stirpium adversaria. Antverpiæ 1576, fol. p. 395. Bauhini Histor. plant. ii. p. 993. Chabræi Stirpium sciagraphia. Genevæ 1666, fol. p. 312, and in the appendix, p. 627. C. Bauhini Theatrum botan. p. 530.

§ The beech-tree in German is called *buche* or *buke*; in Danish it is *bög*, and in the Swedish, Russian, Polish, and Bohemian, *buk*. TRANS.

heidenkorn (heath-corn), by which it is known in Germany, has been given it because it thrives best in poor sandy soil where there is abundance of heath. From the epithets *Turcicum* and *Saracenicum*, its native country cannot be determined, for maize is called Turkish wheat, though it originally came from America. I consider also as improbable the conjecture of the learned Frisch,* that from the word *heide* (a heathen), an expression little known in Upper Germany, has arisen the appellation of *ethnicum*,† and thence *Saracenicum*, given to this plant, though the Bohemians call it *pohanka*, from *pohan*, which signifies also a heathen.

There is reason to believe, that this grain must have been common in many parts of Germany in the fifteenth century. In a bible, printed in Low-German, at Halberstadt, in the year 1522, entitled *Biblia Dudesch*, the translator, who is not known, but who is supposed to have been a catholic, translates a passage of Isaiah, chap. xxviii. ver. 25, which Luther translates *er säet spelz*, he soweth spelt, by the words *he seyet bockwete*, he soweth buck-wheat.‡ The name *heydenkorn* occurs in a catalogue of plants so early as the year 1552;* and Jos. Maaler, or Pictorius, has in his Dictionary, printed in octavo, at Zurich in 1561: Heidenkorn, *Ocimum*. I find there also, Heydel, a plant, *Panicum*. Dasypodius† likewise in his Dictionary, of which I have the edition printed in 1537, says *Panicum*, Butzweyss, Heydel; and in a vocabulary of the names of plants, added to it: Heydel, *Panicum*. Butz Weysz, *Panicum*. Frisch has the word Heydel-Fench, which he explains by Buck-wheat; and he remarks that in the Swiss dialect *Buch* is changed into *Butz*. Ryff or Rivius, a physician who lived in the middle of the sixteenth century, has changed *Buch* or *Book* into *Bauch*, and such errors often arise by transforming the High- into Low-German. It has, however, analogy in its favour, for the long *o* of the Low-Ger-

---

* In Teutschen Wörterbuche, p. 434. This derivation may be found also in *Martinii Lexicon.* art. *Fagopyrum.*

† Buck-wheat is sometimes named by botanists *frumentum ethnicum* (heathen-corn), and *triticum Saracenicum*, because some have supposed that it was introduced into Europe from Africa by the Saracens. TRANS.

‡ A particular description of this scarce bible may be found in J. H. a Seelens Selecta litteraria; Lubecæ 1726, 8vo. p. 398, 409.

In the Septuagint the word used is ζεα. The reasons assigned for supposing the translator to have been a catholic seem to me of little force.

[*] This small work is entitled *Vocabula rei nummariæ, ponderum et mensurarum Græca, Latina, Ebraica, - - - additæ sunt appellationes quadrupedum, et frugum* - - - collectæ a Paulo Ebero et Casp. Peucero. Witebergæ 1552, 8vo. The passage to which I allude is as follows: Ireo cerealis, vel erysimum cereale, vulgare frumentum Saracenicum, quod a triquetra figura quidam Trigonum, appellant, *Heydenkorn*. I shall here take occasion to remark, that I find in the same work the name *Staudenkorn* for Typha, tritico simillima, fœcundior olyra et altior, grana majora, et majore copia profert. The later writers on agriculture give this name to a kind of rye. We are told in *Placcii Theatrum anon.* i. p. 377, that this catalogue was written by *Jos. Simler*.

[†] Dictionarium Latino-Germanicum. Argentorati, 4to.

man is in High-German often changed into *au*: for example, *look*, *lauch*; *schmooken*, *smauchen*; *ook*, *auch*; *ooge*, *auge*. But the long *o* of the Low-German becomes frequently the long *u* of the High-German; as *good*, *gut*; *buch*, *buchbaum*; *book*, *bookbaum*, &c.

That buck-wheat was cultivated in England about the year 1597, is proved by Gerard's Herbal.

A new species of this grain has been made known of late years, under the name of Siberian buck-wheat, which appears by experience to have considerable advantages over the former. It was sent from Tartary to Petersburgh by the German botanists who travelled through that country in the beginning of the last century; and it has thence been dispersed over all Europe. We are however told in the new Swedish Economical Dictionary, that it was first brought to Finland by a soldier who had been a prisoner in Tartary.[*] Linnæus received the first seeds in 1737, from Gerber the botanist,[†] and described the plant in his *Hortus Cliffortianus*. After this it was mentioned by Ammann,[‡] in 1739; but it must have been earlier known in Germany, at least in Swabia; for in 1733 it was growing in the garden of Dr. Ehrhart, at Memmingen.[*] In Siberia this plant sows itself for four or five years by the grains that drop, but at the end of that time the land becomes so full of tares that it is choked, and must be sown afresh.[†] Even in the economical gardens in Germany, it is propagated in the same manner; and it deserves to be remarked that it grows wild among the corn near Arheilgen, a few miles from Darmstadt, though it is cultivated no where in the neighbourhood.[‡] Had it been indigenous there, Ehrhart might in 1733 have raised it from German seed.

---

[*] Nya Swenska Economiska Dictionnairen. Stockholm 1780, 8vo. vol. ii.

[†] Abhandlungen der Schwedisch. Akad. der Wissenschaften, vi. p. 107, where is given, as far as I know, the first figure of it.

[‡] Stirpes rariores Imperii Russici, 1739, 4to.

The appellation of *Saracenicum* gives me occasion to add the following remark: Ruellius[§] says, that in his time a plant had begun to be introduced into the gardens of France, but merely for ornament, called Saracen-millet, the seeds of which were brought to that country about fifteen years before. This millet, which was from five to six feet in height, was undoubtedly a *holcus*, and perhaps the same kind as that sought after by us for cultivation a few years ago, under the name of *holcus sorghum*.* This *holcus*, however, was cultivated, at least in Italy, long before the time of Ruellius; for there is little reason to doubt that it was the *milium Indicum*, which was brought from India to that country in the time of Pliny.† That ancient naturalist says, it was a kind of millet seven feet high; that it had black seeds, and was productive almost beyond what could be believed. In the time of Herodotus it was cultivated at Babylon, but it must have been then little known to the Greeks; for that historian would not venture to mention its size and fertility, as he was afraid that his veracity might be called in question.* According to his account, it grew to be as large as a tree. It is worthy of remark, that this kind of millet is still cultivated at Babylon, where it was seen and admired by Rauwolf.† It is undoubtedly the monstrous *holcus* mentioned by Apollonius, who considered it as one of the most remarkable productions of India.‡ It appears that it con-

---

[*] This is asserted by Phil. Fred. Gmelin, in Ehrharts Œkonomische pflanzen historie, viii. p. 72. The last eight parts of this work were published by Gmelin after Ehrhart's death in April 1756.

[†] Falk, Reise durch Russland.

[‡] Romers Neues Magazin für die Botanik, vol. i.

[§] *Ruellius De natura stirp.* lib. ii. cap. 27: Hodie Galli in hortis ostentationis gratia serunt, grano pisum æquante, atro, stipula arundinea quinum apud nos senumve pedum proceritate, quod milium Saracenicum, quasi peregrinum, nominant, nec ante quindecim annos huc advectum. Stephanus says almost the same thing in his *Prædium rusticum*, p. 432: Quod autem milium in hortis nostratibus ostentationis gratia seritur, grano pisum æquante, stipula arundinea, quinum apud nos senumve pedum proceritate, id vero peregrinum est, et alterius generis, unde milium Saracenicum nominant.—Some very improperly have considered this plant as Turkish-wheat.

---

* Several species of this genus were cultivated in the southern districts, the names of which may be found in my *Grundsätzen der Teutschen Landwirthschaft*, p. 128. Their distinguishing characteristics do not however appear as yet to be fully established. Bauhin makes the proper *sorghum* to be different from the *durra* of the Arabs. The former is called in his *Theat. botanic.* p. 510, Milium arundinaceum sive Indicum, Sorgo dictum. *Histor. plant.* ii. p. 447. The *durra* in *Theat. plant.* is named milium arundinaceum semine plano et albo, and also in *Histor. plantar.* ii. p. 448. Linnæus in his last writings has separated *holcus bicolor* from *sorghum*. Forskal in *Flora Egyptiaco-Arabica*, Hafniæ 1775, 4to. p. 174, thus describes the *durra:* Holcus panicula ovata; spiculis sessilibus, subvillosis; alternatim appendiculatis; flosculo uno vel duobus vacuis, sessilibus. There are kinds of it with white and reddish-yellow (*fulva*) seeds. According to his account, however, the Arabs cultivate another kind known under the name of *dochna*, though in less quantity, chiefly as food for fowls. This species he calls: Holcus paniculæ ramis subternato-verticillatis, patentibus, rudimentis florum sessilibus, sub floribus fertilibus, aristatis. Semen magnitudine oryzæ; ovale, compressum, ferrugineum.

† *Plin.* lib. xviii. cap. 7: Milium intra hos decem annos ex India in Italiam invectum est nigrum colore, amplum grano, arundineum culmo. Adolescit ad pedes altitudine septem prægrandibus

---

culmis; lobas vocant; omnium frugum fertilissimum. Ex uno grano terni sextarii gignuntur. Seri debet in humidis. Hardouin remarks that *phobas* ought to be read here instead of *lobas*. What gave rise to this emendation will readily appear to those who read *Theophrast. Hist. plant.* lib. viii. cap. 3. Φοβη, *juba*, *coma*, corresponds exceedingly well with the *thyrse*, *panicula diffusa* of the *holcus sorghum* which is sold at Venice for brooms, as we are told by Ray in his *Hist. plant.* Pliny says, in the place above quoted, Milii comæ granum complexæ fimbriato capillo curvantur.

* Herodot. lib. i. cap. 193: Εκ δε κεγχρου και σησαμου όσον τι δενδρου μεγαθος γινεται, εξεπισταμενος, μνημην ου ποιησομαι. Milii vero ac sesami proceritatem instar arborum, etsi mihi compertam, tamen commemorare supersedeo, probe sciens, iis qui nunquam Babylonicam regionem adierunt, quæ de frugiferis dicta sunt, incredibilia visum iri.

† Beschreibung der reyss Leonhardi Rauwolfen. Frankf. 1582, 4to. ii. p. 68. The author observes that this kind of millet is mentioned also by Rhases and Serapion.

‡ Philostrat. Vita Apollon. lib. iii. cap. 2. This *sorghum* perhaps is meant also in *Dionysii Periegesis*, v. 1126. p. 134.

tinued to be cultivated by the Italians in the middle ages; for it was described in the thirteenth century by Crescentio, who speaks of its use and the method of rearing it.* The seeds had some time before been brought from Italy to Germany,† and we find that it is on that account called Italian millet. The old botanists named it also *sorgsamen*, and *sorgsaat*; appellations formed from *sorghum*. The name *morhirse*, under which it again came to us from Swisserland, in latter times,‡ has arisen either from the black colour of one of the kinds, or it may signify the same as *Moren-hirse*, (Moorish-millet), because it is almost the only corn of the sable Africans.§ However this may be, it can never become an object of common cultivation among us, for our summer is neither sufficiently long nor sufficiently warm, to bring it to perfection. Last summer (1787) I could with difficulty obtain a few ripe grains for seed.

---

* Melica cioe saggina e conosciuta, et e di due manere, una rossa et una bianca, e trovasene una terza manera che a più bianca che l' miglio. *Crescentio, D'agricoltura.* In Venetia 1542, 8vo. lib. iii. cap. 17. It appears therefore that in our dictionaries *saggina* ought not to be explained by Turkish wheat alone.

† Bauhini Theat. plant. l. c.

‡ Andrea, Briefe aus der Schweitz. Zurich 1776, 4to. p. 182.

§ Adanson, Reise nach Senegal; übersetzt von Martini. Brandenburg 1773, 8vo. p. 56, 125.

SADDLES.

In early ages the rider sat on the bare back of his horse without any thing under him;[*] but, in the course of time, some kind of covering, which consisted often of cloth, a mattrass, a piece of leather or hide, was placed over the back of the animal. We are informed by Pliny,[†] that one Pelethronius first introduced this practice; but who that person was is not certainly known. Such coverings became afterwards more costly;[‡] they were made frequently in such a manner as to hang down on both sides of the horse, as may be seen by the beautiful engravings in Montfaucon,[§] and were distinguished among the Greeks and Romans by arious names;[*] but even after they were common, t was reckoned more manly to ride without them. Varro boasts of having rode, when a young man, without a covering to his horse;[†] and Xenophon[‡] reproaches the Persians because they placed more clothes on the backs of their horses than on their beds, and gave themselves more trouble to sit easily than to ride skilfully. On this account such coverings were for a long time not used in war; and the old Germans, who considered them as disgraceful, despised the Roman cavalry who employed them.[§] The information, therefore, of

---

[*] J. Lipsii Poliorcet. seu de militia Romana, lib. iii. dial. 7. Antverpiæ 1605, 4to. p. 142.

[†] Lib. vii. cap. 56, Frenos et strata equorum Pelethronius invenit. The same account is given by *Hyginus*, fab. 274.

[‡] Coverings for horses made of the costly skins of animals are mentioned by *Silius Italicus*, lib. iv. 270, and lib. v. 148. In the latter place he says—

Stat sonipes, vexatque ferox humentia frena,
Caucasium instratus virgato corpore tigrim.

They are mentioned also by *Statius*. See *Thebiad.* lib. iv. 272. Costly coverings of another kind occur in Virgil, Æneid. lib. vii. 276; viii. 552; and Ovid. Metam. lib. vii. 33. Livy, lib. xxxi. cap. 7, comparing the luxury of the men and the women, says: Equus tuus speciosius instructus erit, quam uxor vestita.

[§] Antiquité expliquée, tom. ii. lib. 3. tab. 27, 28, 29, 30.

---

[*] Seneca, Epist. 80: Equum empturus, solvi jubes stratum. *Macrob. Saturnal.* i. 11: Stultus est, qui, empturus equum, non ipsum inspicit, sed stratum ejus et frenum. *Apuleius, De Deo Socratis*, calls these coverings for horses *fucata ephippia.*—They were called also *στϱαματα*.

[†] Nonius Marcellus, De proprietate sermonum, 2. p. 545: Ephippium, tegmen equis ad mollem vecturam paratum. *Varro, Cato, vel de educandis liberis:* Mihi puero - - - - equus sine ephippio.

[‡] Nunc autem stragula (*στϱαματα*) plura in equis habent, quam in lectis; non enim tam equitationis curam habent, quam mollioris sessionis. *Pæd.* lib. viii.

[§] Neque eorum moribus turpius quidquam aut inertius habetur quam ephippiis uti. Itaque ad quemvis numerum ephippiatorum equitum quamvis pauci adire audeunt. *Cæsar, De bello Gallico,* lib. iv. 2. An old saddle with stirrups was formerly shown to travellers at Berne in Switzerland, as the saddle of Julius Cæsar. See *Relations historiques et curieuses de voyages,* par C. P. (Patin). A Rouen 1676, 12mo. p. 270. The stirrups, however, were afterwards taken away, and in 1685 they were not to be seen. *Mélanges historiques, recueillis et commentez par Mons.* ——. A Amsterdam 1718, 12mo. p. 81.

Dion Cassius,* according to whom such coverings were first allowed to the Roman cavalry by Nero, is very doubtful. This author, perhaps, alludes only to reviews, at which, it is probable, the cavalry were before obliged always to appear without them. In the time of Alexander Severus, the horses of the whole Roman cavalry had beautiful coverings.† Saddles, however, at that period were certainly unknown, though they afterwards obtained the old name *ephippium*, which originally signified nothing more than a covering for a horse. Xenophon says, a rider, whether placed on the bare back of the animal or on a covering, must not assume a position as if he sat upon one of those seats which people use in carriages.‡

---

* Lib. lxiii. 14. Ferunt equites Romanos militantes, Neronis temporibus, dum quotannis recensentur, primum ephippiis usos fuisse. Εν τῃ ετησιᾳ σφων εξετασει. After writing the above, I found with satisfaction that Le Beau, in *Mémoires de litterature de l'Académie des Inscriptions*, vol. xxxix. p. 333, forms the same conjecture. Before that period the cavalry, when reviewed, were obliged to produce their horses without any covering, that it might be more easily seen whether they were in good condition. This useful regulation was abolished by Nero, in order that the cavalry might exhibit a grander appearance. He employed his soldiers for show, as many princes do at present. *Animum modo uti pascat prospectus inanem.* Virgil. Georg. lib. ii. 285.

† Equis etiam instructi et ephippiis et frenis decentibus, ut Romanam rempublicam intelligeret quicumque Alexandri vidisset exercitum. *Lamprid. Vita Alex. Severi*, cap. 50.

‡ De re equestri, p. 602: Επει δ᾽αν γε μην καθιζηται, εαν τε επι ψιλου, εαν τε επι του εφιππιου, ου την ὡσπερ επι του διφρου ἑδραν επαινουμεν. Sive super nudo equo, seu etiam in ephippio resederit, non laudatur quasi

Our saddles at present consist of a wooden frame called the saddle-tree, which has on the fore part the pommel; behind it the crupper; and at the sides the stirrups. In the inside they are stuffed like a cushion, and on the outside are covered with leather or cloth. They are made fast to the horse by means of a girth which goes round the animal's belly; and the breast-leather and crupper prevent them from being moved either forwards or backwards. It is extremely probable that they were invented in the middle of the fourth century: but it is hardly possible to find any certain proof; for we have reason to believe that the ancient covering was gradually transformed into a saddle. Pancirollus* thinks that the first mention of a saddle is to be found in Zonaras; and many have adopted his opinion. This historian relates that Constantine the younger was killed in the year 340 when he fell from his saddle. But in this proof alone I place very little confidence; and Pancirollus seems to have founded his assertion on the Latin translation, in which the word *sella* is used. Both the Greek and Latin terms,† it is true, were employed at later periods to signify

---

curulis quædam sessio, sed ut cruribus divaricatis maxime rectitudo custodiatur. Respecting the stool or chair placed in carriages for people to sit on, του διφρου ἑδρα, see *Pitisci Lexic. antiq.* iii. p. 369, art. *Sella curulis.*

* De rebus deperditis, lib. ii. tit. 16. p. 273.

† Ἑδρα and sella.

a proper saddle; but the Greek word was used long before for the back of the horse, or the place where the rider sat; and the words of Zonaras may be so understood as if Constantine was killed after he had fallen from his horse.*

Montfaucon † has given a figure of the pillar of Theodosius the Great, on which he thinks he can distinguish a saddle; and indeed, if the engraving be correct, it must be allowed that the covering of the horse on which the rider sits seems, in the fore part, to resemble the pommel, and behind the extremity of the saddle-tree of our common saddles.

The clearest proof of the antiquity of saddles is the order of the emperor Theodosius in the year 385, by which those who wished to ride post-horses were forbidden to use saddles that weighed more than sixty pounds. If a saddle was heavier, it was to be cut to pieces.* This passage appears certainly to allude to a proper saddle, which at that period, soon after its invention, must have been extremely heavy; and we may conclude from it also, that every traveller had one of his own. As the saddle is here called *sella*, and as that word occurs oftener at this than at any other period, for the seat of the rider, it is probable that it is to be understood afterwards as signifying a real saddle. Besides, it cannot be denied that where it is used, many other little circumstances are found which may with great propriety be applied to our saddles.

---

* Zonaras, lib. xiii. cap. 5. Paris 1687. fol. ii. p. 12. Εκπιπτει της ἑδρας ὁ Κωνσταντινος. Nicetas in Andronicus Comnenus, lib. i. p. 183: Της ἑδρας αποβαλλεται. The word ἑδρα occurs twice in *Xenophon De re equestri*. In page 596 of the before-mentioned edition, an account is given how the back of the horse should be shaped in order that the rider may have a fast and secure seat: τῳ αναβατῃ ασφαλεστεραν την ἑδραν: and in p. 600, where he speaks of currying, the author says that the hair on a horse's back, εν τῃ ῥαχει, ought to be combed down, as the animal will then be less hurt by his rider: ἡκιστα γαρ αν βλαπτοι την ἑδραν του ἱππου. I have taken the trouble to consult other historians who give an account of the death of Constantine; but they do not mention this circumstance. See *Zosimus*, lib. ii. 41; *Victor. Epitome*, cap. 41; *Socrates*, lib. ii. 5; *Eutropius*, lib. x. 5.

† Antiq. expliquée, vol. iv. lib. iii. cap. 75, tab. 30.

Nazarius, in his panegyric on Constantine the Great, describing the manner in which the enemy's cavalry were destroyed, says that, when almost lifeless, they hung *sedilibus*.† Lipsius is of opinion that they could have hung in this manner only by saddles; but there is reason to think that they might lay hold of the coverings of the horses, if it be certain that these were girded to the animals like our saddles. Of this, however, there is no proof; for though some have asserted that *postilena* signified a girth, that meaning has not been supported by sufficient authorities; and it is more probable that the words, *postilena*, *antilena*, and also *postella* and *antella*,* as well as the girth itself, which they are supposed to express, were not introduced till after the invention of saddles. The first word occurs in Plautus; † but it perhaps alludes to some part of the harness of draught-horses or cattle. Vegetius ‡ distinguishes saddle-horses from others; and the saddle-tree seems to be mentioned by Sidonius Apollinaris.§ In the fifth century saddles were made so extravagantly magnificent, that a prohibition was issued by the emperor Leo I, in which it was ordered that no one should ornament them with pearls or precious stones.|| In the sixth century, the emperor Mauritius required that the saddles of the cavalry should

---

* Quoniam veredorum quoque cura pari ratione tractanda est, sexaginta libras sella cum frenis; triginta quinque vero averta non transeat; ea conditione, ut si quis præscripta moderaminis imperatorii libramenta transcenderit, ejus sella in frusta cedatur, averta vero fisci viribus deputetur. *Codex Theodosian.* lib. viii. tit. 5. leg. 47. p. 554. The same order occurs also in the *Codex Justin.* lib. xii. tit. 51, 12. p. 1013. and in Βασιλικων lib. lvii. tit. 17, *edit. Leunclavii*, Basiliæ 1575, fol. p. 481.

† Tunc ire præcipites, labi reclines, semineces vacillare, aut moribundi sedilibus attineri, permixta equorum clade jacere. Cap. 24.

---

* Antella, quasi ante sella, quemadmodum postella, quasi post sella. *Isidorus*, 20, 16.

† Casina, i. 37. See Scheffer, De re vehiculari. Francofurti 1671. 4to. p. 125: and Gesneri Thesaur. Ling. Lat.

‡ De arte veterinaria, iv. 6, 2 and 4.

§ Alii sanguine et spumis pinguia lupata suscipiunt, alii sellarum equestrium madefacta sudoribus fulcra resupinant. Lib. iii. epist. 3.

|| Nulli prorsus liceat, in frenis et equestribus sellis vel in balteis suis margaritas et smaragdos et hyacinthos aptare posthac vel inserere; aliis autem gemmis frena et equestres sellas et balteos suos privatos exornare permittimus. *Codex Justin.* lib. xi. tit. 11.

have large coverings of fur.[*] Further information respecting saddles in later times, may be seen in Du Cange, who has collected also various terms of art to which the invention of saddles gave rise, such as *sellatores*, saddlers, of which the French have made *selliers*; *sellare*, the saddle-tree; *sellare* and *insellare*, to saddle. The ignominious punishment of bearing the saddle, of which a good account may be found in Du Cange,[†] had its origin in the middle ages. The conjecture of Goropius Becanus,[‡] that the saddle was invented by the *Salii*, and named after them, is not worth refutation; as it is perfectly clear that the denomination of *sella* arose from the likeness of a saddle to a chair; and by way of distinction Sidonius and the emperor Leo say *sella equestris*; and Jornandes says *sella equitatoria*. Others, perhaps, will pass no better judgment on a conjecture which I shall here venture to give. I consider it as probable that the invention of saddles belongs to the Persians; because, according to the testimony of Xenophon, they first began to render the seat of the rider more convenient and easy, by placing more covering on the backs of their horses than was usual in other countries. Besides, the horses of Persia were first made choice of in preference for saddle-horses, on account, perhaps, of their being early trained to bear a saddle, though Vegetius* assigns a different reason. Of the improvements or alterations made afterwards in saddles, I have been able to find no account.

---

[*] Mauricii Ars militaris; edit. Schefferi, lib. i. cap. 2. Χρη τας σελας εχειν επισελια δασεια και μεγαλα. Sellas habere debent cum tegumentis hirsutis et magnis. It is worthy of remark that the Greek word σελα, sella, occurs at this period. The same word is to be found in the *Tactica* of the emperor Leo, cap. 6, § 9, edit. Meursii, Lugduni Bat. 1612, 4to. p. 57.

[†] Under the article *Sellam gestare*.

[‡] Lib. ii. Francicorum, p. 48.

STIRRUPS.

RESPECTING the antiquity of stirrups several men of learning† have long ago made researches; but as their observations are scattered through a great variety of books, some of which are now scarce, and are mingled with much falsehood, it will, perhaps, afford pleasure to many to find here collected and reduced into order the greater, or at least the most important, part of them. In executing this task I shall aim at more than the character of a diligent collector; for to bring together information of this kind, to arrange it, and to make it useful, requires no less readiness of thought than the labours of those who assume the character of original thinkers, and who imagine that they render others inferior to themselves when they bestow on them the appellation of collectors.

---

* Ad usum sellæ Persis provinciis omnibus meliores præstat equos, patrimoniorum censibus æstimatos, tam ad vehendum molles et pios incessibus, nobilitate prætiosos. *Vegetius, De arte veterin.* iv. 6. 4to. p. 1157.

† The principal works in which information is to be found on this subject are the following: *Hieron. Magii Miscellan.* lib. ii. cap. 14; in *Gruteri Lampas seu Thesaurus criticus*, tom. ii. p. 1339. *Lipsii Poliorceticon sive de militia Romana.* Antverpiæ 1605, lib. iii. dial. 7, p. 139. *Pitisci Lexicon antiquit. Rom.* iii. p. 482. *Salmasius in Ælii Spart. Antonin. Carac.* p. 163. *G. J. Vossius de vitiis sermonis.* Amstelodami 1695, fol. p. 11. *Polyd. Vergilius de rerum inventoribus.* Lugdun. Bat. 1664, 12mo. lib. iii. cap. 18. *Hugo de militia equestri*, i. 4. *Licetus de lucernis*, vi. 30. *Potter, Archæolog. Græca*, iii. 3. *Menagiana*, iv. p. 263. *Brown, Essai sur les erreurs populaires*, ii. p. 162. The history and art of horsemanship, by Richard Berenger; London 1771, 4to. i. p. 64. *Montfaucon, Antiquité expliquée*, tom. iv. lib. 3. cap. 3. p. 77, and

We have here a new proof how much people may be deceived, when they suppose that objects must be of great antiquity because they tend to common convenience, and because they appear even so indispensably necessary and easy to have been invented, that one can scarcely conceive how they could at any time have been wanting. I cannot, however, deprive our ancestors of the merit of ingenuity and invention; for they must undoubtedly have possessed no small share of talents and ability, to perform, without the assistance of our arts, what perhaps would be difficult even for the present age to accomplish. And who knows but

Supplement, tom. iv. lib. ii. cap. 4. p. 25. *Le Beau de l'équipement du cavalier légionaire*; in *Mémoires de litterature de l'Académie des Inscriptions*, tom. xxxix. p. 537.

there are many things still to be invented, the discovery of which may give posterity equal reason to reproach us?

Stirrups are useful in two points of view; for they not only assist one in mounting, but also in riding, as they support the legs of the rider, which otherwise would be exposed to much inconvenience. No traces of any invention for this purpose are to be found in the old Greek and Latin writers; and though means to assist people to get on horseback were devised in the course of time, neither stirrups nor any permanent support to the legs were for a long period thought of. Nothing that could perform the same service as a stirrup is to be perceived on ancient coins which exhibit the representation of persons on horseback; on statues cast or formed with the chisel; or on any remains of ancient sculpture. In the excellent equestrian statues of Trajan and Antoninus, the legs of the rider hang down without any support whatever. Had stirrups been in use when these statues were formed, the artists certainly would not have omitted them; and the case would have been the same with those writers who speak so fully of riding, and of the necessary equipage and furniture. How is it possible that Xenophon, in the two books which he wrote expressly on horsemanship and the art of riding,* where he gives rules for mounting, and where he points out means for assisting old people and infirm persons, should not have mentioned stirrups had he been acquainted with them? And how could they have been passed over by Julius Pollux, in his Lexicon,* where he gives every expression that concerns riding-furniture?

---

* Xenophon, De re equestri. Joachim Camerarius caused a

Hippocrates† and Galen‡ speak of a disease which in their time was occasioned by long and frequent riding, because the legs hung down without any support. Suetonius§ also relates that Germanicus, the father of Caligula, by riding often after dinner endeavoured to strengthen his ancles, which had become weak; and Magius explains this very properly by telling us, that as his legs hung down without stirrups, they would be continually moved backwards and forwards,

---

translation of this book to be printed separately, which seems to be little known. It has in the title, *In hoc libello hæc insunt: De tractandis equis* (This addition is by Camerarius himself); *Conversio lib. Xenophontis de re equestri*; *et Historia rei nummariæ*. Tubingæ 1539, 71 pages 8vo.—*Xenophon de magisterio equitum*, in the edition of Basle 1555, fol. p. 612.

* Lib. i. cap. 11. p. 129.

† De aere, locis et aquis, in the Franckfort edition of 1595, fol. sect. 3. p. 76. The author here speaks in particular of the Scythians, who were always on horseback; but he afterwards extends his observations to all those much addicted to riding.

‡ Galen. de parvæ pilæ exercitio, cap. 5. De sanitate tuenda, lib. ii. cap. 11.

§ Vita Caligulæ, cap. 3.

and of course the circulation of the blood towards those parts would be increased.

Neither in the Greek nor Roman authors do we meet with any term that can be applied to stirrups; for *staffa*, *stapia*, *staphium*, *stapha*, *stapedium*, *stapeda*, and *stapes* are words formed in modern times. The last, as Vossius and others say, was invented by Franc. Philelphus,[*] who was born in 1398 and died in 1481, to express properly a thing unknown to the ancients, and for which they could have no name. The other words are older, as may be seen in Du Cange, and appear to be derived from the German *stapf*, which is still retained in *fuss-stapf*, a foot-step.

The name of one of the ear-bones, which, on account of its likeness to a stirrup, has from anatomists received the same appellation, may occur here to some of my readers; and if that expression was known to the ancients, it might invalidate my assertion. That small bone, however, was first remarked at Naples in the year 1546 by John Philip Ingrassias, a Sicilian, who called it *stapes*. To the ancient anatomists it was not known.[†]

---

[*] Respecting this Philelphus see Fabricii Biblioth. med. et inf. ætatis, vol. v. p 845.

[†] The history of this anatomical discovery, written by Ingrassias himself, may be found in *J. Douglas, Bibliographiæ anatomicæ specimen*; Lugd. Bat. 1734, 8vo. p. 186. This discovery was claimed by a person named Columbus; but that it belongs to Ingrassias has been fully proved by Fallopius in his *Observat. Anato-*

Montfaucon is of opinion that it is impossible there could be stirrups before saddles were invented, because the former, at present, are fastened to the latter. This conclusion, however, is not altogether just. Stirrups might have been suspended from leather straps girt round the horse. In mounting, it would only have been necessary that some one should hold fast the strap on the other side; and stirrups arranged in this manner would have supported the feet of the rider as well as ours. It is certain that mounting on horseback was formerly much easier than it has been since the invention of high saddles; and it is probable that stirrups were introduced soon after that period. The arguments which I have here adduced will receive additional force when one considers the inconvenient means which the ancients employed to assist them in getting on horseback; and which, undoubtedly, they would not have used had they been acquainted with stirrups.

The Roman manners required that young men and expert riders should be able to vault on horseback without any assistance.* To accustom them

---

micæ. See *Fallopii Opera,* Francofurti 1606, fol. p. 365. Deus gloriosus scit Ingrassiæ fuisse inventum.

* — — — — Corpora saltu
Subjiciunt in equos.

Virg. Æneid. lib. xii. 287.

to this agility there were wooden horses in the Campus Martius, on which practitioners were obliged to learn to mount and dismount, both on the right and the left side, at first unarmed, and afterwards with arms in their hands.* In many public places, particularly highways, stones were erected, to which a rider could lead his horse in order to mount with more facility. Such stones Gracchus caused to be set up;† and they were to be found at many cities, in the sixteenth century, especially near the council-houses, that they might be used by the members of the council, who at that time did not ride in coaches. A convenience of this kind was constructed at the Roman gate at Francfort‡ in 1502; and steps for the same purpose may be still seen in many parts of England, where they are employed principally by the ladies.* If a certain ludicrous inscription be ancient, such a stone was called *suppedaneum*; but this word occurs no where else.†

---

* Non tantum a tironibus, sed etiam a stipendiosis militibus, salitio equorum districte semper est exacta. Quem usum usque ad hanc ætatem, licet jam cum dissimulatione, pervenisse manifestum est. Equi lignei hieme sub tecto, æstate ponebantur in campo. Super hos juniores primo inermes, dum consuetudine proficerent, demum armati cogebantur ascendere. Tantaque cura erat, ut non solum a dextris, sed etiam a sinistris et insilire et desilire condiscerent, evaginatos etiam gladios vel contos tenentes. Hoc enim assidua meditatione faciebant, scilicet ut in tumultu prælii sine mora ascenderent, qui tam studiose exercebantur in pace. *Vegetius De re milit.* i. 18.

† Alios lapides modicis inter se intervallis hinc inde secundum viam disposuit; quibus equitantes sine subjicibus ephippiariis conscenderent commodius equos. *Ως ειη ραδιως τοις ἱπποις εχουσιν επιβαινειν επ᾽ αυτων, αναβολεως μη δεομενοις.* Plutarchus, Vita C. Gracchi, p. 838.

‡ Lersner, Chronike der stadt Frankfurt, i. p. 33.

People of high rank and fortune kept riding-servants to assist them in mounting, who were called *stratores*.‡ It was usual also to have portable stools, which were placed close to the horse when one wished to mount; and this gave rise to the barbarous practice of making conquered princes and generals stoop down that the victor might more easily get on horseback by stepping upon their backs as upon a stool. In this ignominious manner was the emperor Valerian treated by Sapor, king of Persia.§ Some horses also were so instructed that they kneeled until the rider mounted;[*] and warriors had on their spears or lances a step or projection, on which they could rest the foot while they got on horseback.[†] Winkelmann has described a cut stone in the collection of Baron Stosch, on which a rider is represented in the act of mounting with one foot on the step of his spear; and it appears, by an ancient drawing, that a leather loop,[‡] into which the foot could be put, was fastened sometimes to the lance also.[§]

---

* Kalms Reise nach dem Nordlichen Amerika, i. p. 34; and ii. p. 355.

† This inscription may be found in *Thom. Porcacchi Funerali antichi*. Venet. 1574, fol. p. 14.

Dis pedip. saxum
Ciuciæ dorsiferæ et cluniferæ,
Ut insultare et desultare commodetur,
Pub. Crassus mulæ suæ Crassæ bene ferenti
Suppedaneum hoc cum risu pos.

Here *Dis pedip*. seems to be an imitation of *Dis Manibus*; *saxum* of the nsual word *sacrum*: and *bene ferenti* of *bene merenti*.

‡ Lipsius De milit. Romana, p. 140. Pitisci Lexic. antiq. These servants were called also αναϐολεις.

§ Eutrop. lib. ix. cap. 6. Victor. epit. 46. Trebell. Pollio, Vita Valeriani. Hofmanni Lexic. artic. Calcandi hostium corpora ritus, p. 642.

Of those who believe that traces of stirrups are to be found among the ancients, no one has erred more than Galeotus Martius,[||] who follows a wrong reading in Lucretius,[¶] and translates still worse the words which he adopts. Magius and others consider as authentic an inscription, in which stirrups are clearly mentioned; and because the letters D. M. (*diis manibus*), usual in Pagan inscriptions, appear at the top, he places it in the first century of the Christian æra.* Menage,† however, and others have already remarked that this inscription was forged in modern times, and in all probability by Franc. Columna, who lived in the middle of the sixteenth century, and who sometimes called himself Poliphilus.‡ Gruter, therefore, reckons it among those which ought to be rejected as spurious: and of as little authority is the silver coin on which the Emperor Constantine is represented on horseback with stirrups.

---

[*] Strabo, lib. iii. p. 248, edit. Almel. says that the Spaniards instructed their horses in this manner. - - - - Silius Ital. lib. x. 465:

> Inde inclinatus collum, submissus et armos
> De more, inflexis præbebat scandere terga
> Cruribus.—

See also Jul. Pollux, i. 11. Dio Nicæus, in Augusto.

[†] Lipsius understands in this sense what Livy says, book iv. chap. 19, of Cornelius Cossus: Quem cum ictum equo dejecisset, confestim et ipse hasta innisus se in pedes excepit.

[‡] Figures of both may be seen in Berenger, tab. 8, fig. 3; and tab. 4.

[§] By Xenophon this is called απο δορατος αναπηδαν.

[||] De promiscua doctrina, cap. 28.

[¶] Lib. v. 1296: Et prius est repertum in equi conscendere costas. Martius reads *clostris*; and thinks that *clostra* is the Greek name for a ladder, which however is κροσσα.

Magius quotes from the letters of Jerome, who died in the year 420, the following words: *Se cum quasdam accepit litteras jumentum conscensurum, jam pedem habuisse in bistapia.* These words have been again quoted by several writers; and we may readily believe that the author when he wrote them alluded to a stirrup. Magius however quotes from memory, and says, *si memoria non labat.* But these words are not to be found in Jerome;

---

* In this inscription the following words occur: Casu desiliens, pes hæsit stapiæ, tractus interii.

† Menagiana. Paris 1715, vol. iv. p. 83.

‡ Respecting Columna, see Fabricii Biblioth. med. et inf. ætatis, i. p. 1131.

and it is probable that Magius may have read them in the works of some other author.*

The first certain account of stirrups, as far as I have been able to learn, is in a book by Mauritius † respecting the art of war, where the author says, that a horseman must have at his saddle two iron *scalæ*. This work, commonly ascribed to the emperor Mauritius, is supposed to have been written in the end of the sixth century; and it is not a sufficient proof to the contrary, that mention is made in it of the Turks, Franks, and Lombards. The first were then well known; for Justin II some time before had concluded a peace with them: the Lombards made themselves known in the middle of that century; and the Franks had been known much longer.‡ The same words are inserted by the emperor Leo VI, in his work on tactics, which he wrote in the end of the ninth century.§

---

* Aquino says that stirrups are mentioned by Pollux, i. 11. p. 215, 130. In the translation we find also: Cum equo insederis, nequaquam femora ad equi latera comprimas, sed pedes laxos habeas, stanti similis. Stapedes enim magis ad standum quam insidendum parati sunt. In the Greek however, they do not occur: Και γαρ ἡ ισχυς πλεον επι των εστηκοτων, η επι των καθεζομενων. In the latest editions no mention is made of them.

† Mauricii Ars militaris, edita a Joh. Scheffero. Upsaliæ 1664, 8vo. p. 22: Χρη εχειν εις τας σελας σκαλας σιδηρας δυο.

‡ Mauric. p. 253: Οἱ Τουρκοι, Φραγγοι, Λογγοβαρδοι. Not however the French, as has been translated in Algem. Welthistor. xiii. p. 342. - - - Offerhaus, Histor. univers. p. 361, 365.

§ Leonis Tactica, edit. Meursii, cap. vi. § 10. p. 57: Εις δε τας σελλας δυο σκαλας σιδηρας.

Still clearer is another passage of Mauritius,[*] and of the emperor Leo,[†] where it is expressly said, that the *deputati*, who were obliged to carry the wounded horsemen from the field, ought to have two stirrups on the left side of the horse, one at the fore-part, and the other at the hind-part of the saddle-tree, that they might each take a disabled soldier on horseback behind them. That these *scalæ* were real stirrups there seems to be no reason to doubt; and in my opinion, that word, and other expressions of the like kind to be found in later writers, may be understood in this sense, especially as concomitant circumstances appear rather to strengthen than to oppose such a conjecture.

Isidore, in the seventh century, says *Scansuæ, ferrum per quod equus scanditur*; and also

---

[*] Lib. ii. cap. 8. p. 64: Ut facile conscendere deputati equos possint suos, simul atque illi qui vulnerati vel delapsi sunt ex equis, oportet duos stapedes (σκαλας) habere deputatos ad sinistram partem sellæ, primum ad ipsius curvaturam, sicut vulgo fieri consuevit (την μιαν προς τη κουρϐη, ὡς εθος εστι), alteram ad partem ejus extremam (και την αλλην προς τη οπισθοκουρϐη); ut si duo equum velint conscendere, hoc est, ipse et alter qui pugnare amplius non potest, unus quidem per stapedem qui est circa curvaturam in eum euitatur, alter vero per eum qui in parte extrema. Κουρϐη, κουρϐιον is the forepart, and οπισθοκουρϐη or οπισθοκουρϐιον the hind part of the saddle-tree. Meursius thinks that the latter signifies what the French call *croupe*; but Scheffer, in his notes on Mauritius, p. 401, 425, shows that it is derived from *curvum*. In the *Glossis Basil.* it is said; τα ξυλικια της σελας κουρϐια λεγονται, ὡς καμπυλα· Ligna sellæ dicuntur curbia, quia sunt incurva.

[†] Tactica, cap. xii. § 53. p. 150, where the same words occur.

Astraba, tabella, in qua pedes requiescunt:[*] both which expressions allude to stirrups. Leo the Grammarian, in the beginning of the tenth century,[†] calls them, as Mauritius does, *scalæ*. Suidas, who wrote about the same period, says, *anaboleus* signifies not only a riding-servant, who assists one in mounting, but also what by the Romans was called *scala*.[‡] As the machine used for pulling off boots is named a Jack, because it performs the office of a boy, in the like manner that appellation, which at first belonged to the riding-servant, was afterwards given to stirrups, because they answered the same purpose. Suidas, as a proof of the latter meaning, quotes a passage from an anonymous writer, who says, that Massias, even when an old man, could vault on horseback without the assistance of a stirrup (*anaboleus*).* Lipsius thinks that the passage is to be found in Appian,† respecting Masanissa; and in that case the first meaning of the word may be adopted. Suidas, according to every appearance, would have been in a mistake, had he given Masanissa at so early a period the Roman *scalæ*, with which he could not be acquainted. But that the passage is from Appian, and that Masanissa ought to be read instead of Massias, is only mere conjecture; at any rate Suidas could commit no mistake in saying that the Romans in his time made use of *scalæ*. Lipsius, however, was not altogether wrong in considering this quotation alone as an insufficient proof of stirrups, because with the still older and more express testimony of Mauritius he was unacquainted. Eustathius, the commentator of Homer,‡ speaks in a much clearer manner; but he gives us to understand that stirrups in his time, that is in the twelfth century, had not become very common. On a piece of tapestry of the eleventh century, which Montfaucon caused to be engraven,* the saddles of all the horses appear to have stirrups. Aimonius calls them *scandilia,* † and in the twelfth century the word *staffa* occurs very often, and without doubt in that sense.‡ In the ages of superstition, the clergy carried their boundless pride to such a length, that they caused emperors and kings to hold their stirrups when they mounted on horseback.§ It however long continued to be thought

---

[*] Both passages are quoted by Du Cange from the Glossis Isidori. The latter word signified also the saddle-bow; for Suidas says: Αστραβη, το επι των εφιππιων ξυλον ὁ κρατουσιν οἱ καθεζομενοι. Lignum quod est in ephippiis, quod sessores tenent. Allusion is made to this saddle-bow by the emperor Frederic II. *De arte venandi*, ii. 71. p. 152, where he describes how a falconer should mount his horse: Ponat pedem unum in staffa sellæ, accipiens *arcum sellæ* anteriorem cum manu sua sinistra, supra quam jam non est falco, posteriorem autem cum dextra, super quam est falco. Nicetas, however, in Manuel. Comnen. lib. ii. p. 63, gives that name to the whole saddle; for we are told that the Scythians, when about to cross a river, placed their arms on the saddle (αστραβην), and laying hold of the tails of their horses, swam after them.

[†] Leonis Grammatici Chronographia, printed in the Paris Collection of the Byzantine Historians, with *Theophanis Chronograph.* 1655, fol. In p. 470, where an acconnt is given of the death of one of the murderers of king Michael, in the middle of the ninth century, the author says, Ιακωβιτζης κυνηγων μετα του βασιλεως εν τῳ Φιλοπατιῳ, του ξιφους αυτῳ εκπεσοντος κατελθων του ἱππου αραι αυτο, του ποδος αυτου μη φθασαντος τῃ γῃ επιβηναι, αλλα του ἑτερου κρατηθεντος εν τῃ σκαλῃ, ϑροηθεις ὁ ἱππος διεσυρεν αυτον. - - - Jacobitzes inter venandum una cum imperatore ad Philopatium gladium in terram lapsum levaturus ex equo desiliit; cumque pes ejus terram nondum attigisset, altero in pensili scandula retento, perterritus equus arrepto cursu per valles et præcipitia traxit et membratim discerpsit.

[‡] Αναβολευς, και ἡ παρα Ῥωμαιοις λεγομενη σκαλα. Anaboleus etiam ea, quæ Romanis scala dicitur.

---

* Ὁ δε Μασσιας γηρασας ἱππου χωρις αναβολεως επιβαινεν. Massias, cum senuisset, in equum sine scansorio instrumento conscendit.

† De bellis Punicis, edit. Tollii, p. 107.

‡ Αναβολευς ου μονον το σιδηριον ᾧ τους ποδας εντιθεντες εφιπποι γινονται τινες, αλλα και ανθρωπος ὁς εις τοιουτο εργον καθυπουργει. Anaboleus non

---

solum ferrum illud minutum dicitur, cui pedes imponunt quidam, ut inscendant commodius; sed etiam vir ipse qui ad tale opus adjutat. *Odyss.* lib. i. 155.

* Monumens de la monarchie Françoise, i. tab. 35.

† A quibus et sella ostendebatur, quæ dilapsa cum equo fuerat, cujus scandilia, quamvis nova, et antelam suis impatiens pedibus ipse disruperat. *Aimonius De miraculis Sancti Benedicti,* ii. 20.

‡ *Epistola Alexandri PP. apud Rodulfum de Diceto, anno* 1177: Et cum ascenderemus palefridum nostrum, staffam tenuit. Idem, an. 1170: Cum rex et archiepiscopus secessissent in partem, bisque descendissent, bis stapham rex tenuit archiepiscopo. *Fredericus* II. *De venat.* lib. ii. cap. 71: Deinde ponat pedem suum in staffa sellæ. *From Du Cange.* Stirrups as well as spurs occur seldom on seals in the eleventh century. In the thirteenth they are more frequent. See *P. W. Gerkens Anmerkungen über die siegel.* Stendal 1786, 8vo. part 2. *Heineccius de sigillis,* p. 205. I shall here remark that *Cœlius Rhodiginus,* xxi. 31, is mistaken when he says that Avicenna calls stirrups *subsellares. Licetus, De lucernis,* p. 786, has proved that this Arabian author speaks only of a covering to secure the feet from frost.

§ Instances of this pride have been collected by Du Cange in his annotations on Cinnamus, p. 470, and more may be found in his

Montfaucon is of opinion that it is impossible there could be stirrups before saddles were invented, because the former, at present, are fastened to the latter. This conclusion, however, is not altogether just. Stirrups might have been suspended from leather straps girt round the horse. In mounting, it would only have been necessary that some one should hold fast the strap on the other side; and stirrups arranged in this manner would have supported the feet of the rider as well as ours. It is certain that mounting on horseback was formerly much easier than it has been since the invention of high saddles; and it is probable that stirrups were introduced soon after that period. The arguments which I have here adduced will receive additional force when one considers the inconvenient means which the ancients employed to assist them in getting on horseback; and which, undoubtedly, they would not have used had they been acquainted with stirrups.

The Roman manners required that young men and expert riders should be able to vault on horseback without any assistance.* To accustom them

---

micæ. See *Fallopii Opera,* Francofurti 1606, fol. p. 365. Deus gloriosus scit Ingrassiæ fuisse inventum.

* — — — — Corpora saltu
Subjiciunt in equos.

Virg. Æneid. lib. xii. 287.

to this agility there were wooden horses in the Campus Martius, on which practitioners were obliged to learn to mount and dismount, both on the right and the left side, at first unarmed, and afterwards with arms in their hands.* In many public places, particularly highways, stones were erected, to which a rider could lead his horse in order to mount with more facility. Such stones Gracchus caused to be set up;† and they were to be found at many cities, in the sixteenth century, especially near the council-houses, that they might be used by the members of the council, who at that time did not ride in coaches. A convenience of this kind was constructed at the Roman gate at Francfort‡ in 1502; and steps for the same purpose may be still seen in many parts gether.* These indeed were only a sort of chirurgical bandages; but such shoes were given in

---

* Non tantum a tironibus, sed etiam a stipendiosis militibus, salitio equorum districte semper est exacta. Quem usum usque ad hanc ætatem, licet jam cum dissimulatione, pervenisse manifestum est. Equi lignei hieme sub tecto, æstate ponebantur in campo. Super hos juniores primo inermes, dum consuetudine proficerent, demum armati cogebantur ascendere. Tantaque cura erat, ut non solum a dextris, sed etiam a sinistris et insilire et desilire condiscerent, evaginatos etiam gladios vel contos tenentes. Hoc enim assidua meditatione faciebant, scilicet ut in tumultu prælii sine mora ascenderent, qui tam studiose exercebantur in pace. *Vegetius De re milit.* i. 18.

† Alios lapides modicis inter se intervallis hinc inde secundum viam disposuit; quibus equitantes sine subjicibus ephippiariis conscenderent commodius equos. Ὡς ειη ῥαδιως τοις ἱπποις εχουσιν επιϐαινειν επ᾽ αυτων, αναϐολεως μη δεομενοις. Plutarchus, Vita C. Gracchi, p. 838.

‡ Lersner, Chronike der stadt Frankfurt, i. p. 33.

author speaks of the common broom (*spartium scoparium*) that grows on our moors. M. Broussonet, in *Memoires d'agriculture, par la Societé de Paris,* 1785, trimestre d'automne, p. 127, has also recommended the cultivation of the *spart. junceum,* under the name of *genet d'Espagne,* and enumerated the many uses to which it may be applied. The people in Lower Languedoc, especially in the neighbourhood of Lodeve, make of it table-cloths, shirts, and other articles of dress. The offal or rind serves as firing. This *spartum* of the Greeks, or *spartium junceum* of the botanists, is the species called by Pliny, book xxxix. chap. 9, *genista,* and which he improperly considers as the Spanish and African *spartum.* The latter is certainly the *stipa tenacissima,* which grows in Spain and Africa, called there at present *sparto* or *esparto,* and which is still prepared and employed as described by Pliny, b. xix. c. 2. Baskets, matrasses, ship-cables, and other strong ropes were made of it; and when this rush had been prepared like hemp, it was used for various fine works. Even at present the Spaniards make of it a kind of shoes called *alpergates,* with which they carry on a great trade to the Indies, where they are very useful on the hot, rocky, and sandy soil. The best account of this rush may be found in *Clusii Histor. plantar. rar.* p. 220; in *Löfling's Reisebeschreibung,* Berlin 1776, 8vo. p. 169; *Osbecks Reise,* p. 18; the Paris *Schauplatz der künste*; and the *Encyclopédie methodique des manufactures,* par Roland de la Platiere, art. *Sparte.* Whether the ancients made shoes for their cattle of the *spartium junceum* or the *stipa tenacissima,* I will not venture to determine. It is probable that the former was used by the Greeks, and the latter by the Romans; and it is highly worthy of being here remarked, that in modern times a kind of socks for horses were made of a species of *spartum,* as we learn from John Leo, who says: Quosdam reperias, qui sportas certosque funiculos parant, quos Africani equorum pedibus addere solent. *J. Leonis Africæ Descriptio.* Antverpiæ 1556, 8vo. lib. iii. p. 120. The same author however says expressly, p. 96, that common shoes of iron were also used.

* Columella, vi. 12, 3: Spartea munitur pes. vi. 15, 1: Spartea calceata ungula curatur. *Vegetius,* i. 26, 3: Spartea calceare cu-

particular to mules, which in ancient times were employed more than at present for riding; and it appears by two instances of immoderate extravagance handed down to us by Roman writers, that people of rank caused these shoes to be made very costly. Nero, when he undertook short journeys, was drawn always by mules which had silver shoes;* and those of his wife Poppæa had shoes of gold.† The information of these authors however is not sufficient to enable us to conjecture how these shoes were made; but from a passage of Dio Cassius we have reason to think that the upper part only was formed of those noble metals, or that they were perhaps plaited out of thin slips.‡

Arrian also reckons these soles or shoes among the riding-furniture of an ass.§ Xenophon relates

---

tabis. See also ii. 45, 3. *Galen De alim. facult.* i. 9: Σπαρτος εξ ὁυ πλεκουσι ὑποδηματα ὑποζυγιοις. Is there not some reason therefore to conclude that this practice was followed not merely in regard to cattle only that were diseased?

[*] Nunquam carrucis minus mille fecisse iter traditur, soleis mularum argenteis. *Sueton. Vita Neronis,* cap. 30.

[†] Nostra ætate Poppæa, conjux Neronis principis, delicatioribus jumentis suis soleas ex auro quoque induere. *Plin.* lib. xxxiii. cap. 11.—Scheffer, *De re vehiculari,* proves that we are here to understand she-mules.

[‡] Dio Cassius, or Xiphilinus, lxii. 28: Τας ἡμιονους τας αγουσας αυτην επιχρυσα σπαρτια ὑποδεισθαι. Mulas quibus agebatur habebat aureis soleis calceatas. Commodus caused the hoofs of a horse to be gilded. *Dio Cassius.* lxxiii. Τας ὁπλας καταχρυσωσας.

[§] Commentar. in Epictetum, lib. iii. edit. Coloniæ 1595, 8vo. p. 366: Ὁταν εκεινο οναριον ᾖ, τ'αλλα γινεται χαλιναρια του οναριου, σαγματια.

that certain people of Asia were accustomed, when the snow lay deep on the ground, to draw socks over the feet of their horses, as they would otherwise, he adds, have sunk up to the bellies in the snow.* I cannot comprehend how their sinking among the snow could, by such means, have been prevented; and I am inclined rather to believe, that their feet were covered in that manner in order to save them from being wounded. The Russians, in some parts, such as Kamtschatka, employ the same method in regard to the dogs which draw their sledges, or catch seals on the ice. They are furnished with shoes which are bound round their feet, and which are so ingeniously made that their claws project through small holes. †

The shoes of the Roman cattle must have been very ill fastened, as they were so readily lost in stiff clay; ‡ and it appears that they were not used

---

ὑποδηματια - - Aselli sunt freni, clitellæ, *ferreæ* calces. The last word is added by the translator. Ὑποδηματα comes from ὑποδεω, subligo.

* Xenophon de Cyri Min. expedit. p. 228: Διδασκει ὁ κωμαρχης περι τους ποδας των ἱππων και των ὑποζυγιων, σακκια περιδειν, ὁταν δια της χιονες αγωσιν. Pagi præfectus docuit, ut per nivosam viam sacculis equorum et jumentorum pedes obligarent, quod nudis pedibus ingredientes usque ad ventrem in ipsas nives descenderent.

† B. F. Hermann, Beytrage zur physik. œconomie - - besonders der Russischen Länder. Berlin 1786, 8vo. part i. p. 250. See also *Physikal. œkonom. biblioth.* xiv. p. 459. The same account respecting the dogs of Kamtschatka is given in Cook's last Voyage.

‡ Nunc eum volo de tuo ponte mittere pronum,
Si pote stolidum repente excitare veternum,

during a whole journey, but were put on either in miry places, or at times when pomp or the safety of the cattle required it; for we are informed by Suetonius, that the coachman of Vespasian once stopped on the road to put on the shoes of his mules.*

The reason why mention of these shoes on horses occurs so seldom, undoubtedly is, because, at the time when the before-quoted authors wrote, mules and asses were more employed than horses, as has been already remarked by Scheffer and others. Artemidorus speaks of a shod horse, and makes use of the same expression employed in regard to other cattle.† Winkelmann has described a

---

Et supinum animum in gravi derelinquere cœno,
Ferream ut soleam tenaci in voragine mula.
Catullus, viii. 23.

By this passage it appears that the shoe was of iron, iron wire, or plate-iron.

* Mulionem in itinere quodam suspicatus ad calceandas mulas desiluisse, ut adeunti litigatori spatium moramque præberet; interrogavit Quanti calceasset? Pactusque est lucri partem. *Sueton. Vita Vespas.* cap. 23. Vespasian seems to have suspected that his driver had been bribed to stop by the way, and that he had done so on pretence of shoeing his horses. Had the mules been shod, and had the driver only had to rectify something that related to the shoe, as our coachmen have when a nail is lost, or any other little accident has happened, Suetonius would not have said *mulas* but *mulam*. The driver therefore stopped for the first time on the journey to put on the shoes of his cattle, as has been remarked by Gesner.

† Εδοξε τις ἱππου ὑποδηματα ὑποδεδεσθαι. Εστρατευσατο και εγενετο ἱππευς. Ουδεν γαρ διεφερεν, ἢ αυτον ἢ τον βασταζοντα ἱππον ὑποδεδεσθαι τα ὑποδηματα. Existimavit quis equi calceatum se habere. Militavit et factus est eques. Nihil enim intererat aut ipsum, aut equum ipsius gesta-

cut stone in the collection of baron Stosch,* on which is represented the figure of a man holding up one foot of a horse, while another, kneeling, is employed in fastening on a shoe. These are all the proofs of horses being shod among the ancients with which I am acquainted. That they were never shod in war, or at any rate, that these socks were not sufficient to defend the hoof from injury, seems evident from the testimony of various authors. When Mithridates was besieging Cyzicus, he was obliged to send his cavalry to Bithynia; because the hoofs of the horses were entirely spoiled and worn out. † In the Latin translation, it is added that this was occasioned by the horses not having shoes; but there are no such words in the original, which seems rather to afford a strong proof that in the army of Mithridates there was nothing of the kind. The case seems to have been the same in the army of Alexander; for we are told by Diodorus Siculus, that with uninterrupted marching the hoofs of his horses were totally

---

torem, calceatum habere. *Artemidori Oneirocritica.* Lutetiæ 1603, 4to. lib. iv. cap. 32.

* Description des pierres gravées du Baron de Stosch. A Florence 1760. 4to. p. 169.

† Τους δ᾽ ἱππους αχρειους οἱ τοτε οντας, και ασθενεις δι᾽ ατροφιαν, και χωλευοντας εξ ὑποτριβης, ες Βιθυνιαν περιεπεμπεν. Equos vero tum inutiles et infirmos ob inediam, claudicantesque solearum inopia detritis ungulis, aversis ab hoste itineribus misit in Bithyniam. *Appian. De bello Mithridat.* edit. Tollii, p. 371. The conjecture of Mr. Schweighäuser, that the reading ought to be ὑπο τριβης, is highly probable.

broken and destroyed.* An instance of the like kind is to be found in Cinnamus, where the cavalry were obliged to be left behind, as they had suffered considerably in the hoofs; an evil, says the historian, to which horses are often liable. †

From what has been said I think I may venture to draw this conclusion, that the ancient Greek and Roman cavalry had not always, or in common, a covering for the hoofs of their horses, and that they were not acquainted with shoes like those used at present, which are nailed on. In the remains of ancient sculpture, among the ruins of Persepolis,‡ on Trajan's pillar, those of

---

* Και των μεν ἱππων, δια την συνεχειαν της ὁδοιποριας, τας ὁπλας ὑποτετριφθαι συνεβαινε, των δε ὁπλων τα πλειστα κατεξανθαι. Equorum ungulæ propter itinera nunquam remissa detritæ et armorum pleraque absumpta erant. *Diodor. Sicul.* lib. xvii. 94. edit. Wesselingii, p. 233. *Vegetius*, i. 56, 28, mentions a salve, quo ungulæ nutriantur, et medicaminis beneficio subcrescat quod itineris *attriverat* injuria.

† Παθος γαρ τι τοις αυτων πελμασιν επιγεγονος, ὁ δη τῳ ἱππειῳ επισκεπτειν ειωθε γενει, ισχυρως αυτους επιεζεν. Cæteras copias manere in Attalia et equos curare jussit; nam malum, cui est obnoxium equinum genus, plantis pedum acciderat graviterque affecerat. *Joh. Cinnamus De rebus gestis Imperat.* edit. Tollii, Trajecti ad Rhenum 1652, 4to. lib. iv. p. 194. Vegetius, ii. 58, recommends rest for horses after a long journey, on account of their hoofs. "Memineris ungulas excrescendo renovari, et ideo interpositis diebus vel singulis mensibus talis cura non deerit, per quam naturæ emendatur infirmitas."

‡ No traces of them are to be found in the figures given by Chardin, and by Niebuhr in the second volume of his Travels. The latter mentions this circumstance in particular, and says, p. 157, "It appears that the ancient Persians had no stirrups and no proper saddle."

Antoninus, Marcus Aurelius, and many others; no representation of them is to be found; and one can never suppose that the artists designedly omitted them, as they have imitated with the utmost minuteness the shoes of the soldiers, and the nails which fasten on the iron that surrounds the wheels of carriages. The objection that the artists have not represented the shoes then in use, and that for the same reason they might have omitted shoes such as ours though common, is of no weight; for the former were used only very seldom; they were not given to every horse, and when they were drawn over the hoof and made fast, they had an awkward appearance, which would not have been the case with iron shoes like those of the moderns. A basso-relievo, it is true, may still be seen in the Mattei palace at Rome, on which is represented a hunting-match of Gallienus, and where one of the horses has a real iron shoe on one of his feet. From this circumstance Fabretti* infers that the use of horse-shoes is of the same antiquity as that piece of sculpture; but Winkelmann has remarked, that this foot is not ancient, and that it has been added by a modern artist.†

I will readily allow that proofs drawn from an object not being mentioned in the writings of the ancients are of no great importance, and that they may be even very often false. I am however of opinion, whatever may be said to the contrary, that Polybius, Xenophon in his Book on riding and horsemanship, Julius Pollux in his Dictionary where he mentions fully every thing that relates to horse-furniture and riding-equipage, and the authors who treat on husbandry and the veterinary art, could not possibly have omitted to take notice of horse-shoes, had they been known at those periods when they wrote. Can we suppose that writers would be silent respecting the shoeing of horses, had it been practised, when they speak so circumstantially of the breeding and rearing of these animals, and prescribe remedies for the diseases and accidents to which they are liable? On account of the danger which arises from horses being badly shod, the treatment of all those disorders to which they are incident has been committed to farriers; and is it in the least probable, that this part of their employment should have been entirely forgotten by Vegetius and the rest of the ancients, who studied the nature and maladies of cattle? They indeed speak seldom, and not very expressly, of the ancient shoes put on horses; but this is not to be wondered at, as they had little occasion to mention them, because they gave rise to no particular infirmity. Where they could be of utility, they have recommended them; which plainly shows that the use of them was not then common. Gesner remarks very properly, that Lycinus, in Lucian, who was unacquainted with riding, when enumerating the many dangers to which he might be exposed by mounting on horseback, speaks only of being trod under the feet of the cavalry, without making any mention of the injury to be apprehended from iron shoes. To be sensible, however, of the full force of this argument, one must read the whole passage.* Many of the ancient historians also, when they speak of armies, give an account of all those persons who were most necessary in them, and of the duties which they performed; but farriers are not even mentioned. When it was necessary for the horses to have shoes, each rider put them upon his own; no persons in particular were requisite for that service; but had shoes, such as those of the moderns, been then in use, the assistance of farriers would have been indispensable.

---

* De columna Trajani, cap. 7.

† Pierres gravées du Baron de Stosch, p. 169.

As our horse-shoes were unknown to the ancients, they employed the utmost care to procure horses with strong hoofs,* and for the same reason they tried every method possible to harden the hoofs and to render them more durable. Precepts for this purpose may be found in Xenophon.† Vegetius,‡ and other authors. It indeed appears wonderful to us, that the use of iron shoes should have remained so long unknown; but it was certainly a bold attempt to nail a piece of iron, for the first time, under the foot of a horse; and I firmly believe that there are many persons at present, who, had they never seen such a thing, would doubt the possibility of it if they heard it mentioned. Horse-shoes, however, are not absolutely necessary; horses in many countries are scarce, and in some they are not shod even at present. This is still the case in Ethiopia, in Japan, and in Tartary.§ In Japan, shoes, such as those

---

* *Navigium seu Vota.* Nunquam equum ullum ascendi ante hunc diem. Proinde metuo, tubicine classicum intonante, decidens ego in tumultu a tot ungulis conculcer, aut etiam equus ferocior existens, arrepto freno in medios hostes efferat me, aut denique oporteat me alligari ephippio, si manere super illud debeam, frenumque tenere.—Had stirrups been then in use, he would have been exposed also to the danger of being dragged along by the heels. When I extracted the above passage, I had no edition of Lucian at hand but that of Basle, 1563, 12mo. It may be found there, vol. ii. p. 840.

---

* The prophet Isaiah, chap. v. ver. 28, to make the enemy appear more terrible, says, "The hoofs of their horses shall be counted like flint;" and Jeremiah, chap. xlvii. v. 3, speaks of the noise made by the horses stamping with their hoofs. See *Bochart. Hierozoic.* i. p. 160.

† De re equestri, cap. iv. p. m. 599.

‡ Lib. i. cap. 56, 2; and cap. 28 and 30; also Lib. ii. cap. 57 and 58.

§ J. Ludolphi Hist. Æthiop. i. cap. 10, and his Commentarium, p. 146. *Thevenot,* vol. ii. p. 113. *Voyage de Le Blanc,* part ii. p. 75, 81. *Lettres édifiantes,* vol. iv. p. 143. *Tavernier,* vol. i. c. 5. *Hist. gen. des voyages,* vol. iii. p. 182. *Kæmpfer, Histoire du Japon*; Amsterd. 1732, 3 vol. 12mo. ii. p. 297. The passage of the last author, where he mentions the articles necessary for a journey in Japan, is worthy of notice: "Shoes for the servants and for the horses. Those of the latter are made of straw, and are fas-

[illegible]

[illegible]

[illegible] They are fastened round the [illegible] stones from injuring the feet, and [illegible] These shoes are not strong: [illegible] and can be found every where throughout the country. [illegible] *Europa, Africa, Asia*, af Carl Peter Thunberg. [illegible] p. 172. Shoes of the same kind, the author informs us, are worn by the inhabitants. TRANS.]

shoes such as ours, I think it my duty to mention and examine those grounds from which men of learning and ingenuity have affirmed the contrary. Vossius lays great stress, in particular, upon a passage of Xenophon, who, as he thinks, recommends the preservation of the hoofs by means of iron. Gesner, however, has explained the words used by that author so clearly as to leave no doubt that Vossius judged too rashly. Xenophon* only gives directions to harden the hoofs of a horse, and to make them stronger and more durable; which is to be done, he says, by causing him to walk and to stamp with his feet in a place covered with stones. He describes the stones proper for this purpose; and that they may be retained in their position, he advises that they should be bound down with cramps of iron. The word which Vossius refers to the hoofs, alludes without doubt to the stones which were to be kept together by the above means. Xenophon, in another work, repeats the same advice,† and says that experience will soon show how much the hoofs will be strengthened by this operation.

---

* Exteriore quidem parte sui stabulum ita rectissime se habebit et pedes equi ampliabit, si rotunda saxa palmari magnitudine, pondere libræ, quam multa quatuor aut quinque plaustra vehere possint, effuse dejiciantur et ferro includantur, ne a se discedant. Ac super hæc inductus equus quasi in lapidosa via singulis diebus aliquantisper gradiatur. Nam sive destringatur, seu a muscis pungatur, uti ungulis illum non secus quam si vadat, necesse est. Etiam testudinem pedis hoc modo effusi lapides solidant. *De re equestri*, p. 599.

† Quemadmodum autem fiant pedes equorum robustissimi, si quis habet faciliorem et promptiorem exercitationem, eam sequatur;

Vossius considers also as an argument in his favour the expressions used by Homer and other poets when they speak of iron-footed and brazen-footed horses, loud-sounding hoofs, &c.* and is of opinion that such epithets could be applied only to horses that had iron shoes. But if we recollect that hard and strong hoofs were among the properties of a good horse, we shall find that these expressions are perfectly intelligible without calling in the assistance of modern horse-shoes. Xenophon employs the like comparisons free from poetical ornament, and explains them in a manner sufficiently clear. The hoofs, says he, must be so hard, that when the horse strikes the ground, they

---

sin minus, illud usu doctus faciendum suadeo, ut conjectis confuse ex via lapidibus plus minus unius libræ, hic collocetur equus interim dum fricatur a præsepi solutus. Ingredi enim per lapides illos equus non desistet, neque cum detergetur, neque cum calcaribus additis incitabitur. Qui autem periculum fecerit, iis quæ a me dicuntur fidem habebit, equique pedes rotundos effectos animadvertet (στρογγυλους τους ποδας του ἱππου οψεται). *Hipparch.* p. m. 611.

[*] Homer. Iliad. lib. xiii. 23, and lib. viii. 41: χαλκοποδες ἱπποι. Iliad. v. 772: ὑψηχεες ἱππόι. Iliad. xi. 152: εριγδουποι ποδες ἱππων. Dacier, Polydore Vergil, and Eustathius understand the words which immediately follow the last passage as if the horses beat the ground or dust with some metal; δηϊοωντες alludes however to the riders, ἱππεις, or even the πεζοι mentioned a little before, and not to the horses. The meaning therefore is, that the Greeks struck the Trojans with the metal weapons which they had in their hands. Aquino, whose opinion Vossius approves, cites on this occasion the ἱππους χαλκοκροτους of Aristophanes in his *Equiles*, ver. 549.

may resound like a cymbal.[*] Eustathius, the scholiast of Aristophanes, and Hesychius,[†] have also explained these expressions as alluding to the hardness and solidity of the hoofs. Of the same kind is the *equi sonipedes* of the Roman poet;[‡] and the stags and oxen with metal feet,[§] mentioned in fabulous history, which undoubtedly were not shod. Epithets of the like nature were applied by the poets to persons who had a strong voice.[||]

Le Beau quotes a passage of Tryphiodorus, which on the first view seems to allude to a real horse-shoe. This author, where he speaks of the construction of the Trojan horse, says that the artist did not forget the metal or iron on the hoofs.[¶]

---

[*] In the beginning of the book: ὥσπερ κυμϐαλον ψοφει προς τῳ δαπεδῳ. These words are quoted by Pollux, i. 188. p. 118.

[†] The last-mentioned author explains χαλκοποδας by ισχυροποδας. Pindar, Pyth. iv. 402. p. 239, gives the horses ὁπλας χαλκειας, ungulas æreas. Stephanus in his Dictionary explains χαλκοπους very improperly in the following manner: Æreos habens pedes, seu cujus pedes æreis soleis ferrati sunt.

[‡] Virg. Æneid. lib. iv. 135. lib. xi. 600, 638.

[§] Ausonius: Vincunt æripedes ter anno Nestore cervi. Virg. Æneid. lib. vi. 803. Ovid. Heroid. ep. xii. 93, and Metamorph. lib. vii. 105. Apollonius, lib. iii. 228.

[||] Iliad. lib. v. 785. Stentor is there called χαλκεοφωνος. Iliad. lib. xviii. 222, Achilles is said to have had a brazen voice. Virg. Georg. lib. ii. 44: ferrea vox.

[¶] *Tryphiodori Ilii excidium*, published in octavo at Oxford in 1739, by Merrick, with a free poetical English translation, and the Latin translation of Frischilin. *The destruction of Troy*, v. 86, p. 14:

But supposing it true, that the author here meant real shoes, this would be no proof of their being known at the time of the Trojan war, and we could only be authorised to allow them the same antiquity as the period when the poet wrote. That however is not known. According to the most probable conjectures, it was between the reign of Severus and that of Anastasius, or between the beginning of the third and the sixth century. Besides, the whole account may be understood as alluding to the ancient shoes. At any rate, it ought to be explained in this manner till it be proved by undisputed authorities that shoes, such as those of the moderns, were used in the time of the above poet.

Vossius asserts that he had in his possession a Greek manuscript on the veterinary art, in which there were some figures, where the nails under the feet of the horses could be plainly distinguished. But we are ignorant whether the manuscript or the figures still exist, nor is the antiquity of either of them known. It is probable that shoes were given to the horses by a modern transcriber, in the same manner as another put a pen into the hand of Aristotle.

Ου' μεν επι κνημησιν αχαλκεες εξεχον όπλαι,
Μαρμαρεης δ' ελικεσσι κατεσφηκωντο χελωνης,
Απτομεναι πεδιοιο μογις κρατερωνυχι χαλκῳ.

Ungula quin etiam ferro non absque micabat,
Crura feri subter; sed vincta volumine conchæ
Vix sola tangebat validi munimine ferri.

In my opinion we must expect to meet with the first certain information respecting horse-shoes in much later writers than those in which it has been hitherto sought for, and supposed to have been discovered. Were it properly ascertained that the piece of iron found in the grave of Childeric, was really a part of a horse-shoe, I should consider it as affording the first information on this subject, and should place the use of modern horse-shoes in the eighth century. But I do not think that the certainty of its being so is established in a manner so complete as has hitherto been believed. Those who affirmed that this piece of iron had exactly the shape of a modern horse-shoe, judged only from an engraving, and did not perceive that the figure was enlarged.* The piece of iron itself, which seemed to have four holes on each side, was so consumed with rust, that it broke while an attempt was made to clear them; and undoubtedly it could not be so perfect as the engraving.

---

* The first figure may be found in *Anastasis Childerici, Francorum regis, sive Thesaurus sepulchralis Tornaci Nerviorum effossus; auctore J. J. Chifletio.* Antverpiæ 1655, 4to. p. 224. The whole description is as follows: Ferrea solea; sed ita rubigine absumpta, ut dum veruculo clavorum foramina (quæ utrimque quaterna erant) purgare leviter tentarem, ferrum putre in fragmenta dissiluerit, et ex parte dumtaxat hic repræsentari potuerit. Montfaucon, in *Les monumens de la monarchie Françoise*, Paris 1729, 4 vol. fol. i. p. 16. tab. 6, has given also an engraving of it, and says below: Solea ferrea equi regii hic totâ repræsentatur, etsi pars ejus tantum reperta sit; sed ex illa parte totius formam excipere haud difficile fuit. Modicæ magnitudinis equus erat.—Childeric died in the year 481. In 1653 his grave was discovered at Tournay, and a gold ring with the royal image and name found in it afforded the strongest proof that it was really the burying-place of that monarch. In the year 1665, these antiquities were removed to the king's library at Paris.

The account given by Pancirollus induced me to hope that I should find in Nicetas undoubted evidence of horse-shoes being used about the beginning of the thirteenth century; but that writer has deceived both himself and his readers, by confining himself to the translation. After the death of Henry Baldwin, the Latins threw down a beautiful equestrian statue of brass, which some believed to be that of Joshua. When the feet of the horse were carried away, an image was found under one of them which represented a Bulgarian, and not a Latin as had been before supposed. Such is the account of Nicetas; but Pancirollus misrepresents it entirely; for he says that the image was found under a piece of iron torn off from one of the feet of the horse, and which he considers therefore as a horse-shoe. The image, however, appears to have represented a vanquished enemy, and to have been placed in an abject posture under the feet of the statue (a piece of flattery which artists still employ), and to have been so situated that it could not be distinctly seen till the whole statue was broken to pieces. Hence perhaps arose the vengeance of the Latins against the statue, because that small figure was by some supposed to represent one of their nation.*

---

* The whole account may be found at the end of the Annals,

As it appeared to me that the words used by ancient authors to express shoes* occurred less frequently in the writers of later periods, I conjectured that modern horse-shoes, in order that they should be distinguished from the ancient shoes, might have received a particular new name, under which I had never found them mentioned. In the course of my researches, therefore, I thought of the Greek word *selinaia*, the meaning of which I had before attempted to explain; and I am now fully convinced that it signifies horse-shoes, such as those used at present, as has been already remarked by others. As far as I know, that word occurs, for the first time, in the ninth century, in the works of the Emperor Leo:† and

---

in the Paris edition by Fabrotti, 1647, fol. p. 414: Αναμοχλευσαντες τοινουν ραιστηρσι το πελμα το ἱππειον, ανθροπομορφον εὑρισκουσιν ινδαλμα ὑποκειμενον. Proinde malleis equi calce revulsa, humanam subtus imaginem reperiunt, quæ majori ex parte Bulgarum aliquem repræsentabat, clavo transfixam, et plumbo undique cinctam; non autem Latinum referebat, quemadmodum jam diu a multis ferebatur.

[*] The words ὑποδηματα and *soleæ*.

[†] Leonis Tactica, v. 4. p. 51.—In the passage where he names every thing belonging to the equipage of a horseman, he says: πεδικλα σιλεναια σιδηρα μετα καρφιων αὐτων. I shall here first remark, that after πεδικλα there ought to be a comma, for by that word is meant the ropes with which saddled horses were fastened. Du Fresne or Du Cange, in *Glossarium ad Scriptores mediæ et infimæ Græcitatis*, Lugd. 1688, fol. p. 1139, says πεδικλουν signifies *to bind*. See likewise Scheffer's Annotations on *Mauricii Ars militaris*, p. 395. The translator also has improperly said: Pedicla, id est calceos lunatos ferreos cum ipsis carphiis. Καρφια means *nails*, as Du Fresne has proved by several instances, and here *horse-shoe nails*.

this antiquity of horse-shoes is, in some measure, confirmed by their being mentioned in the wri-

---

The word may be found for the second time in the tenth century, in the *Tactica* of the Emperor Constantine, where the whole passage, however, is taken from Leo without the least variation; so that we may suppose Constantine understood it in the same sense as Leo. It is used, for the third time, by the same emperor, twice in his book on the Ceremonial of his own court. In p. 265, where he speaks of the horses (τα ἱππαρια) which were to be procured for the imperial stable; these, he says, were to be provided with every thing necessary, and to have also σελιναια. In page 267 it is said further, that a certain number of pounds of iron should be given out from the imperial stores to make σελιναια, and other horse-furniture. The same word is used a fourth time by Eustathius, who wrote in the twelfth century, in his Commentary on Homer: Χαλκον δε νυν λεγει τα σεληναια ὑπο τοις ποσι των ἱππων, οἱς διακοπτονται εις πλεον τα πατουμενα. See *Iliad.* lib. xi. 152. Though I do not believe that Homer had the least idea of horse-shoes, I am fully convinced that Eustathius alludes to them by that word. This commentator has explained very properly various passages of the like kind in Homer; but he seems here, as was the case sometimes with his poet himself, to have been asleep or slumbering.

When one considers that the σελιναια, or σεληναια, belonged to horse-furniture; that they were made of iron; that, as Eustathius says, they were placed under the hoofs of the horses; that the word seems to show its derivation from the moon-like form of shoes, such as those used at present; and lastly, that nails were necessary to these σελιναια: I think we may venture to conclude, without any fear of erring, that this word was employed to signify horse-shoes of the same kind as ours, and that they were known, if not earlier, at least in the ninth century.

Most of those who have examined and illustrated the Greek language of modern times agree with me in this opinion. Du Fresne explains σελιναια as follows: Equorum ferrei calcei, a lunulæ forma, quam referunt. Lange, in his *Philologia Barbaro-Græca*, Norimbergæ 1708, 4to. p. 173, translates it *calceus ferreus*. Meursius alone, in *Glossario Græco-Barbarum*, Lugd. Batav. 1614, 4to, p. 494, thinks differently, and maintains that σελιναιον is the same as tings of Italian, English, and French authors of the same century. When Boniface marquis of Tuscany, one of the richest princes of his time, went to meet Beatrix, his bride, mother of the well-known Matilda, about the year 1038, his whole train were so magnificently decorated, that his horses were not shod with iron but with silver. The nails even were of the same metal; and when any of them dropped out they belonged to those who found them. The marquis appears to have imitated Nero; but this anecdote may be only a fiction. It is related by a cotemporary writer; but, unfortunately, his account is in verse; and the author, perhaps sensible of his inability to make his subject sufficiently interesting by poetical ornaments, availed himself of the licence claimed by poets to relate something singular and uncommon.* However this may be, it is certain

---

σελλοπουγγιον, sellipungium, which signifies a portmanteau. The grounds on which he rests his assertion are, that the Emperor Leo in his *Tactica* uses once the words σωροσοκκα πεδικλα, σελιναια σιδηρᾶ: but that in another place, making use of the same expression, he substitutes σελοπουγγιον instead of σελιναια. This conclusion, however, is not just, as the Emperor may have had his reasons for mentioning horse-shoes once without the portmanteau, and for again mentioning the latter without the former. Besides, according to the explanation of Meursius, Leo must have spoken of an iron portmanteau, which can hardly be supposed.

* — — — Qui dux cum pergeret illo,
Ornatus magnos secum tulit, atque caballos,
Sub pedibus quorum chalibem non ponere solum
Jusserat; argentum sed ponere, sit quasi ferrum;

that the shoes of the horses must have been fastened on with nails, otherwise the author could not have mentioned them.

Daniel, the historian, seems to give us to understand that in the ninth century horses were not shod always, but only in the time of frost, and on other particular occasions.* The practice of shoeing appears to have been introduced into England by William the Conqueror. We are informed that this sovereign gave the city of Northampton, as a fief, to a certain person, in consideration of his paying a stated sum yearly for the shoeing of horses ; † and it is believed that Henry de Ferres, or de Ferrers, who came over with William, and whose descendants still bear in their arms six

---

Esse repercussum clavum voluit quoque nullum,
Ex hoc ut gentes possent reperire quis esset.
Cornipedes currunt, argentum dum resilit, tunc
Colligitur passim, passim reperitur in agris
A populo terræ, testans quod dives hic esset.

Vita Mathildis, a Donizone scripta, cap. 9.

This life of Matilda may be found in *Leibnitii Scriptores Brunsuicenses,* vol. i. p. 629 ; but the fullest and correctest edition is in *Muratori Rerum Italicarum Scriptores.* Mediolani 1724, fol. vol. v. p. 353.

* La gelée qui avoit suivi (les pluyes de l'automne) avoit gasté les pieds de la pluspart des chevaux, qu'on ne pouvoit faire ferrer dans un pais devenu tout d'un coup ennemi, lorsqu'on y pensoit le moins. *Histoire de France,* vol. i. p. 566. The author here speaks of the cavalry of Louis le Debonnaire.

† Dugd. Bar. i. 58. ex Chron. Bromtoni, p. 974, 975, Blount's Tenures, p. 50. The latter book I have not seen: I quote it only from the *Archæologia.*

horse-shoes, received that surname because he was entrusted with the inspection of the farriers.* I shall here observe, that horse-shoes have been found, with other riding-furniture, in the graves of some of the old Germans and Vandals in the northern countries; but the antiquity of them cannot be ascertained.†

FLOATING OF WOOD.

THE conveying of wood in floats is an excellent invention; as countries destitute of that necessary article can be supplied by water carriage, not only with timber for building and other useful purposes, but also with fire-wood. The former is either pushed into the water in single trunks, and suffered to be carried along by the stream, or a number of planks are ranged close to each other in regular order, bound together in that manner, and steered down the current, as boats are, by people accustomed to such employment. The first method is that most commonly used for fire-wood. Above floats of the second kind a load of spars, deals, laths, pipe-staves, and other timber, is generally placed; and with these floaters will trust themselves on broad and rapid rivers, whereas fire-wood is fit to be transported only on rivulets or small streams; and sometimes canals are constructed on purpose.* However simple the invention of floating fire-wood may be, I consider the other method as the oldest; and I confess that I do not remember to have found in ancient authors any information respecting the former. Fire-wood was, indeed, not so scarce formerly in the neighbourhood of large cities as it is at present. Men established themselves where it was abundant; and they used it freely, without thinking on the wants of posterity, till its being exhausted rendered it necessary for them to import it from distant places. It is probable that the most ancient mode of constructing vessels for the purpose of navigation gave rise to the first idea of conveying timber for building in the like manner; as the earliest ships or boats were nothing else than rafts, or a collection of beams and planks bound together, over which were placed deals. By the Greeks they were called *schedai*, and by the Latins *rates*; and it is known from the testimony of many writers, that the ancients ventured out to sea with them on piratical expeditions as well as to carry on commerce; and that after the invention of ships they were still retained for the transportation of soldiers and of heavy burthens.[*]

---

* Brook's Discovery of errors in the Catalogue of the nobility, p. 198.

† Beckmann in Beschreibung der Mark Brandenburg, Berlin 1751, 2 vol. fol. i. p. 401, mentions an old shoe found in a grave, the holdfasts of which did not project downwards but upwards. Arnkul in his *Heidnischen alterthümern* speaks also of a horse-shoe found near Kiel.

---

* Those who are desirous of particular information respecting every thing that concerns the floating of wood may read *Bergius, Polizey- und Cameralmagazin,* vol. iii. p. 156; *Krunitz, Encyclopedie,* vol. xiv. p. 286; and the *Forstmagazin,* vol. viii. p. 1. To form an idea of the many laborious, expensive, and ingenious establishments and undertakings which are often necessary in this business, one may peruse *Memoire sur les travaux qui ont rapport à l'exploitation de la mâture dans les Pyrenées.* Par M. Leroy. Londres et Paris 1776, 4to. of which I have given some account in *Physikalisch-ökonom. bibliothek,* vol. ix. p. 157. So early as the time of cardinal Richelieu the French began to bring from the Pyrenées timber for masts to their navy; but as the expense was very great, the attempt was abandoned, till it was resumed in the year 1758 by a private company, who entered into a contract with the minister for supplying the dock-yards with masts. After 1765 Government took that business into their own hands; but it was attended with very great difficulties.

The above conjecture is confirmed by the oldest information to be found in history respecting the conveyance by water of timber for building. Solomon entered into a contract with Hiram, king of Tyre, by which the latter was to cause cedars for the use of the temple to be cut down on the western side of mount Lebanon, above Tripoli, and to be floated to Jaffa. The words at least employed by the Hebrew historian, which occur no where else, are understood as alluding to the conveyance of timber in floats; and this explanation is considered by Mr. Michaelis as probable. At present no streams run from Lebanon to Jerusalem; and the Jordan, the only river in Palestine that could bear floats, is at a great distance from the cedar forest. The wood, therefore, must have been brought along the coast by sea to Jaffa.* In

---

[*] Plinius, lib. vi. cap. 56: Nave primus in Græciam ex Ægypto Danaus advenit; antea ratibus navigabatur, inventis in Mari Rubro inter insulas a rege Erythra. *Strabo*, lib. xvi. relates the same thing, and calls these rafts σχέδαι. *Festus*, p. 432: Rates vocant tigna colligata, quæ per aquam aguntur, quo vocabulo interdum etiam naves significantur. See *Scheffer*, *De militia navali veterum*, lib. i. cap. 3; and *Pitisci Lexicon Antiquitat. Rom.* art. *Rates.*

---

* "My servants shall bring them down from Lebanon unto the sea: and I will convey them by sea in floats unto the place that thou shalt appoint me." 1 *Kings*, chap. v. ver. 9. "And we will cut wood out of Lebanon, as much as thou shalt need: and we will bring it to thee in floats by sea to Joppa; and thou shalt carry it up to Jerusalem." 2 *Chronicles*, chap. ii. v. 16. Pocock thinks that the wood was cut down near Tyre. The accounts given by travellers of mount Lebanon, and the small remains of the ancient forests of cedar, have been collected by Busching in his Geography.

[The following is the account given of these cedars by the abbé Binos, who visited them in the year 1778. "Here," says he, "I first discovered the celebrated cedars, which grow in an oval plain, about an Italian mile in circumference. The largest stand at a considerable distance from each other, as if afraid that their branches might be entangled, or to afford room for their tender shoots to spring up, and to elevate themselves also in the course of time. These trees raise their proud summits to the height of sixty, eighty, and a hundred feet. Three or four, when young, grow up sometimes together, and form at length, by uniting their sap, a tree of a monstrous thickness. The trunk then assumes generally a square form. The thickest which I saw might be about thirty feet round; and this size was occasioned by several having been united when young. Six others, which were entirely insulated, and free from shoots, were much taller, and seemed to have been indebted for their height to the undivided effects of their sap." These cedars, formerly so numerous, are now almost entirely destroyed. In the this manner is the account understood by Josephus; but although he assures us that he gives the letters of both the kings as they were at that time preserved in the Jewish and Tyrian annals, it is certain that they are spurious, and that he took the whole relation from the sacred books of the Jews which are still extant, as he himself tells us in the beginning of his work.*

An old tradition prevailed that the city Camarina, on the southern coast of Sicily, was built of the clay or mud which the river Hipparis carried along with it, and deposited in a lake of the same name. This account seems to be confirmed by a passage in Pindar, which Aristarchus quotes in explaining it;† and, according to Bochart, some

---

year 1550 Bellon counted twenty-eight old ones; Pocock, in 1739, fifteen; and Schulz, in 1755, twenty, besides some young ones. Volney, from report, makes the number to be only five or six. Trans.]

* Antiquit. lib. viii. 2, 7, of the Cologne edition 1691, fol. p. 258. *Τεμων γαρ ξυλα πολλα και μεγαλα κεδρου τε και κυπαρισσου, δια των εμων επι θαλασσαν καταπεμψω, και κελευσω τους εμους σχεδιαν πηξαμενους, εις ὅν αν βουληθης τοπον.* Excisas multas et magnas trabes cedrinas atque cyparissinas, per meos ad mare deducendas curabo; eosdemque jubebo, ut compactis ratibus, ad quemcunque volueris tuæ regionis locum eas appellant, unde post per tuos Hierosolyma deportentur.—These letters have been printed by Fabricius in *Codex pseudepigraphus Veteris Testamenti.* Hamburgi 1722, 8vo. i. p. 1026.

† Κολλᾶ τε σταδι-
 ων θαλαμων ταχεως
ὑψιγυιον αλσος,
απ᾽ αμηχανιας αγων εις φαος
τονδε δᾶμον αστων.

proof is afforded also by the name Camarina, as *chamar* or *chomar* signifies sealing-clay.[*] In this tradition there is nothing improbable. In the like manner the Egyptians drew up mud from the lake Mœris;[†] and thus do the Dutch at present fish up in bag-nets the fine mud or slime which chokes up their rivers, such as the Issel, and which they employ for various uses. This explanation, however, has not been adopted by the old commentators of Pindar. Didymus[‡] and others assert that the poet alludes to wood for building the city being conveyed in floats on the river Hipparis. But whatever opinion may be formed of these elucidations of the scholiasts, we have reason to conclude that the inhabitants of Camarina were much better acquainted with the floating of wood than with drawing up slime by means of bag-nets.

Hipparis aquas suppeditat populo, conglutinatque celeriter stabilium ædium altam silvam, e rerum inopia producens in lucem huncce populum civium: *Olymp.* v. 29. In the summer of the year 1760, when I heard Gesner explain Pindar, he translated φαος or φως by the word *help*, which Hebraism occurs in the New Testament, and also in Homer. The stream therefore assisted the inhabitants while under a great inconvenience.

[*] Chanaan, i. 29. p. 605.

[†] Herodot. lib. iii.

[‡] Didymus ait, amnem per mediam silvam fluere; Camarinensibusque ligna cædentibus in structuram dare ædificiorum; et cum ipsi ex consilii inopia nesciant qua ratione ea deducant ac deferant, excipere ea amnem, et copioso suo flumine deferre in urbem. See the *Oxford edition of Pindar*, 1697, fol. p. 53 and 56, a, 37.

The Romans transported by water both timber for building and fire-wood. When they became acquainted, during their wars against the Germans, with the benefit of the common larch, they caused large quantities of it to be carried on the Po to Ravenna from the Alps, particularly the Rhætian, and to be conveyed also to Rome for their most important buildings. Vitruvius says[*] that this timber was so heavy, that, when alone, the water could not support it, and that it was necessary to carry it on ships or on rafts. Could it have been brought to Rome, conveniently, says he, it might have been used with great advantage in building. It appears, however, that this was sometimes done; for we are told that Tiberius caused the Naumachiarian bridge, constructed by Augustus, and afterwards burnt, to be rebuilt of larch planks procured from Rhætia. Among these was a trunk one hundred and twenty feet in length, which excited the admiration of all Rome.[†]

[*] Propter pondus ab aqua non sustinetur, sed, cum portatur, aut in navibus, aut supra abiegnas rates collocatur. - - - - Hæc (materies larigna) per Padum Ravennam deportatur, in coloniam Fanestri, Pisauri, Anconæ, reliquisque quæ sunt in ea regione municipiis præbetur, cujus materiei si esset facultas apportationibus ad urbem, maxime haberentur in ædificiis utilitates. *Vitruv.* lib. ii. 9. p. 77.

[†] Tiberius Cæsar, concremato ponte Naumachiario, larices ad restituendum cædi in Rhætia præfinivit. *Plin.* lib. xvi. cap. 39, p. 33. Amplissima arborum ad hoc ævi existimatur Romæ visa, quam propter miraculum Tiberius Cæsar in eodem ponte Naumachiario exposuerat advectam cum reliqua materie; duravit ad Neronis principis amphitheatrum. P. 34.

That the Romans procured fire-wood from Africa, particularly for the use of the public baths, is proved by the privileges granted on that account to the masters of ships or rafts by the emperor Valentinian.* Those who have read the writings of the Latin authors with attention must have remarked other testimonies; but I have found no mention in the ancients of floating timber in single planks, or of canals dug for that purpose; at least as far as I can remember. In the Latin language also there are scarcely two words that allude to what concerns the floating of timber; whereas the German contains more of that kind, perhaps, than are to be found in any other; and I am thence induced to conjecture that our ancestors were the first people who formed establishments for this mode of conveyance on a large scale.

The earliest information respecting the floating of wood in Saxony appears to be as old as the year 1258,† when the margrave Henry the Illustrious remitted by charter to the monastery of Porta the duty collected at Camburg from the wood transported on the river Sale for the use of the monastery.* It is, however, uncertain whether wood really conveyed in floats, or transported in boats and lighters, be here meant. Much clearer information concerning wood floated on the Sale is contained in a letter, expedited in the year 1410 by the two brothers Frederic and William, landgraves of Thuringia, and margraves of Misnia, in which, on account of the scarcity of wood that prevailed in their territories, they so much lessened the toll usually paid on the Sale as far as Weissenfels, that a Rhenish florin only was demanded for floats brought on that river to Jena, and two Rhenish stivers for those carried to Weissenfels; but the proprietors of the floats were bound to be answerable for any injury occasioned to the bridge.† In the year 1438, Hans Munzer, an opulent citizen of Freyberg, with the assistance of the then burgomasters, put a float of wood upon the river Mulda, which runs past the city, in order that it might be conveyed thither for the use of the inhabitants and of the mines;‡

---

* Codex Theodos. lib. xiii. tit. 5, 10, edition of Leipsic 1740, fol. vol. v. p. 76: Navicularios Africanos, qui idonea publicis dispositionibus ac necessitatibus ligna convectant, privilegiis concessis dudum, rursus augemus. *Lex* xiii. p. 78. Sed sollicita inspectione prospiciatur, ne a quoquam amplius postuletur, quam necessitas exigit lavacrorum. Compare *Symmachi Epist.* lib. x. ep. 58. As far as I know, such ordinances occur also in the Code of Justinian. The words, *Navigii appellatione etiam rates continentur,* in the *Digesta,* lib. xliii. tit. 12, 14, cannot certainly be applied to such floats, as some have imagined.

† See Sammlung vermischter nachrichten zur Sächsischen geschichte, published at Chemnitz, between 1767 and 1777, in 12 vol. octavo, by G. J. Grundig and J. F. Klotzsch, vol. vi. p. 221.

---

* Pertuchii Chronic. Portense, p. 54. Hornii Henricus Illustris, p. 105. The words are: Telonium, quod de lignis ad usum Portæ deducendis in Sala prope Camburgk dandum fuit, ecclesiæ Portensi - - - - donavit.

† Rudolphi Gotha Diplomatica, pars i. p. 279; and Horn, in Leben Churfürst Friedrichs des Streitbaren, p. 754.

‡ Schmeids, Zwickauisch Chronik, part i. p. 372, 427.

which seems to be a proof that the floating of timber was at that period undertaken by private persons, on their own risk and at their own expenses. In 1486 the floating of wood on the Mulda by the people of Zwikaw, was opposed by the neighbouring nobility; but the rights of the city were protected by the Electors.* When the town of Aschersleben built its church in the year 1495, the timber used for the work was transported on the Elbe from Dresden to Acken, and thence on the Achse to the place of its destination. This is the oldest account known of floating timber on the Elbe. In the year 1521, duke George caused a large canal to be cut at the village of Plauen, which was supplied with water from the Weiseritz, and carried as far as Dresden. It appears that in 1564 there was a float-master, who was obliged to give security to the amount of four hundred florins; so that the business of floating must, at that time, have been of considerable importance.† Floating of wood was undertaken at Annaberg in 1564, by George Oeder, one of the members of the council, and established at the expense of 4000 florins.‡ Of the antiquity of floating in other German States I know nothing more than what is to be gathered from public ordinances respecting this object and forests; by which we learn that in the sixteenth century it was practised in Brandenburg, on the Elbe, Spree, and Havel; in Bavaria, and in the duchy of Brunswick.*

---

* Chronicon Ascaniense, in Abels Sammlung alter chroniken, p. 586.

† Wecks, Dresdener Chronik, p. 17.

‡ Jenisii Annaberga, cap. 15.

As the city of Paris had consumed all the wood in its neighbourhood, and as the price of that article became enormous on account of the distance of forests and the expense of transporting it, John Rouvel, a citizen and merchant, in the year 1549 fell upon the plan of conducting wood bound together along rivers which were not navigable for large vessels. With this view, he made choice of the forests in the woody district of Morvant, which belonged to the government of Nivernois; and as several small streams and rivulets had their sources there, he endeavoured to convey into them as much water as possible.† This great undertaking, at first laughed at, was completed by his successor René Arnoul, in 1566. The wood was thrown into the water in single trunks, and suffered to be driven in that manner by the current to Crevant, a small town on the river Yonne; where each timber-merchant drew out his own, which he had previously marked, and, after it was dry, formed it into floats that were transported from the Yonne to the Seine, and thence to the capital. By this method large quantities of timber are conveyed thither at present from Nivernois and Burgundy, and some also from Franche-Comté. The French extol highly a beneficial establishment formed by one Sauterau, in Morvant, at his own expense, by which the transportation of timber was rendered much speedier, and for which a small sum was allowed him from the proprietors of all the wood floated on the Yonne.

---

* See the Forest laws in *Fritschii Corp. juris ven. forest.*

† Wood was conveyed in boats upon the Yonne so early as the year 1527, as has been related by Coquille in *Histoire du Nivernois*, where he speaks of Clamecy.

The success of this attempt soon gave rise to others. John Tournouer and Nicholas Gobelin, two timber-merchants, undertook to convey floats in the like manner on the Marne; and canals were afterwards constructed in several places for the purpose of forming a communication between different rivers. The French writers consider the transportation of large floats, *trains de bois*, like those formed at present, from the before-mentioned districts, and also from Bourbonnois, Champagne, Lorraine, Montergis, and other parts of the kingdom, as a great invention; but I am firmly of opinion that this method was known and employed in Germany at a much earlier period.*

The floating of wood seems, like many other useful establishments, to have been invented or first undertaken by private persons at their own risk and expense, with the consent of governments, or at least without any opposition from them; but, as soon as it was brought to be useful and profitable, to have been considered among regalia. Hence, therefore, soon arose the float-regal, which, indeed, on account of the free use granted of rivers, the many regulations requisite, and its connexion with the forest-regal, can be sufficiently justified. But when and where originated the term *jus grutiæ*, under which this regal is known by jurists?

---

* Traité de la police, par De la Mare, iii. p. 839. Savary, Dictionnaire de commerce, art. *Bois flotté*, i. p. 566, and art. *Train*, iv. p. 1077.

The few authors who have turned their thoughts to this question have not been able, as far as I know, to answer it with certainty, nor even with probability. They have only repeated, without making any researches themselves, what Stypmann* has said on the subject; and the latter refers to a passage of Hadrian Junius, which I shall here more particularly notice. Junius, speaking of the oldest families in the Netherlands, says that the family of Wassenaer had formerly a certain supremacy over the rivers in Rhineland, so that no one, without their permission, could keep swans on them; and that the brewers paid for the use of the water a certain tax called the *gruytgeld*, from which arose the *jus grutæ*. The origin of this word he did not know; but he conjectured that it was derived either from *gruta*, which signifies duck-weed (*lemna*), a plant that grows in the water and covers its surface during the summer, or from *grut*, an ingredient used in making beer.*

---

* De jure maritimo, p. i. c. 10, n. 100.

---

* As what Junius says is quoted so incorrectly that no conclusion can be formed from it, I shall here insert the passage at length, especially as the book is scarce. In annalium monumentis memoratur Engistus Radbodo genitus, reversus a Britannica expeditione victor, pyrgum Lugdum, alveo Rheni imminentem (quem Leydeburgum vulgus nuncupat) condidisse cum telonio, sub Theodosii imperatoris tempora, atque ex eo Burggraviorum nomen reliquum esse, imperiumque et jus principale in Rhenolandiam ab illis usurpatum, in qua hactenus ut fiduciarii comitum clientes pro mercibus vectigal exigunt, et Plumarii comites (*pluymgraven*) nominantur, quod et illic et in tractu Delphensi illorum injussu nemini fas sit cygnos aut olores publice alere - - - Hinc manavit jus Grutæ, quod penes eosdem semper extitit, quo coctores cerevisiarii pro usu aquæ centesimum illis persolvunt; vernacula lingua *gruytgelt* vocat, sive eam vocem a Flandris mutuata fuerit majorum nostrorum ætas, qui lenticulam palustrem quæ in paludibus et stagnis per æstatem aquæ supernatat, gratissimum anatibus pabulum, *grutum* appellant, quam nos corruptius *croes* vel *croost* dicimus; ut *Gruytgelt* sit vectigal, quod penditur pro tollenda dissipandaque lenticula aquas operiente, quo limpidam hasturis situlisque hauriant ad coquendum usui hominum cerealem potum; sive origo fluxerit (quod nonnulli volunt) ex usu seminii cujusdam aut herbæ, quam cerevisiæ incoquebant, olim *grutzung*, posteris *scarpentunge* dictæ, quæ cujusmodi sit, ignorare me fateor. Quod jus a dynastis potentioribus (ut solet avaritiam illorum et libidinem accendere atque alere æmulatio) usurpatum postea video a Brederodiis apud Cainefatum caput Harlemum, et a Naelduicenis. *H. Junii Batavia.* Lugduni Bat. 1558, 4to. p. 327.—Compare *Hugo Grotius de antiquitate reipub. Batavicæ*, cap. 4, p. 357, published in *Guicciardini Belgicæ descript.* Amstelod. 1660, 12mo. vol. iii. p. 57: Wassenariis vectigalia, velut amnis Rheni custodibus, solvebantur, quæ in hunc diem penes posteros eorum manent.—*Les delices de la Hollande.* Amsterd. 1685, 12mo. p. 218: Les Wassenaers tiennent leur origine d'une

It is certain that in the tenth, eleventh, and thirteenth centuries *gruta*, *grutt*, or *gruit*, signified a tax which brewers were obliged to pay;* but the origin of the word has been sufficiently explained neither by Junius nor any other writer. I no where find that it was used in ancient times for a float-duty; and this meaning Junius himself has not so much as once mentioned.

The word *gruit* occurs under a quite different sense in a letter of investiture of the year 1593, by which the elector of Cologne gave as a fief to the countess of Moers, the *gruit* within the town of

---

village qui est entre Leidem et la Haye, ou des droits qu'ils eurent les siecles passez sur les eaux, les estangs et les lacs de la Hollande.—Those who are fond of indulging in conjecture might form the following conclusion: The lakes and streams belonged to the Wassenaers, who kept swans, geese, and ducks upon them. When the brewers were desirous of clearing the water from the duck-weed, which in Fritsch's German Dictionary is called *enten-grutz*, in order that it might be fitter for use, they were obliged to pay a certain sum to obtain permission; and when the practice of floating timber began, the floats disturbed the ducks, and destroyed the plant on which they fed, and the proprietors of floats were on this account obliged to pay a certain tax also. But was it customary at that period to float timber in the Netherlands?

* Glossarium manuale, iii. p. 850: *Gruta, Grutt, Gruit*, appellant tributum, quod pro cerevisia pensitatur. *Ch. Ottonis Imper.* ann. 999, *apud Wilh. Hedam*, p. 270, edit. prima: Teloneum et negotium generale fermentatæ cerevisiæ, quod vulgo *grutt* nuncupatur. In alia *Henrici Imp.* an. 1003, apud eundem Hedam, habetur *Gruit*. *Grut* in alia anni 1224. apud *Miræum*, t. i. p. 30[illegible]. *Grutta* in *Historia comitum Lossensium*, p. 70.

Berg, with all its rents, revenues, and appurtenances. "No other person was allowed to put *grudt* or any plant in beer, or to draw beer brought from other countries. On the other hand, the countess was to make good *grutt*, and to cause it to be sold at the price usual in the neighbouring parts; she was bound also to supply the elector gratis with what beer was necessary for family consumption; and if more was required than usual, on extraordinary occasions, she was to ask and receive money. If any one in the town did not deliver good *gruidt*, and should prove that he could not deliver better, as the fault was occasioned by the *gruitte*, the loss that might arise should fall upon the countess."* The word *grut* or *gruitt* seems to occur here under a double meaning: as an ingredient in the beer, and as the beer itself which was made from it. Of this difficulty I have in vain endeavoured to find an explanation. *Grut*, perhaps, may signify malt. In Dutch and other kindred languages *grut* means the small refuse which is separated from any thing; and to which *grusch* bran, and *grütze* groats, have an affinity. May not ground malt be understood by it? I have thought likewise of a kind of herb-beer, which was much esteemed in the sixteenth century; and that *grut* might signify a mixture of herbs used for making that beer. It is probable that this word was confined within the boundaries of the Netherlands; and thence only, perhaps, is an explanation of it to be expected.

---

* This curious charter may be found in the addenda, p. 70, to *Kunde's Darstellung der anspruche des grafen von Bentheim-Tecklenburg auf die Herrschaft Bedbur.* Gottingen 1778, fol.

I am, however, still unable to comprehend how the float-duty obtained the name of *jus grutiæ;* and in our kindred languages I can find no derivation of it. The German word *flosz*, from *fliessen*, to flow or glide; *flusz*, a river, occurs in them all. The Dutch say *vlot*, *vlothout*; the Swedes, *en flott*, *flotta*, to float; *flot-wed*, float-wood; and the English, *a float*, *to float*, &c.

LACE.

FIFTY years ago, when a knowledge of many useful and ingenious arts formed a part of the education given to young women destined for genteel life, one who should have supposed that any reader could be ignorant of the manner in which lace is made, would only have been laughed at; but as most of our young ladies at present employ the greater part of their time in reading romances or the trifles of the day, it is probable that many who have even had an opportunity of frequenting the company of the fair sex, may never have seen the method of working lace. For this reason, I hope I shall be permitted to say a few words in explanation of an art towards the history of which I mean to offer such information as I have been able to collect.

Proper lace or point was not wove. It had neither warp nor woof, but was rather knit after the manner of nets (*filets*) or of stockings. In the latter, however, one thread only is employed, from which the whole piece or article of dress is made; whereas lace is formed of as many threads as the pattern and breadth require, and in such a manner that it exhibits figures of all kinds. To weave, or, as it is called, knit lace, the pattern, stuck upon a slip of parchment, is fastened to the cushion of the knitting-box; the thread is wound upon the requisite number of spindles, which are called bobbins; and these are thrown over and under each other various ways, so that the threads twine round pins stuck in the holes of the pattern, and by these means produce that multiplicity of eyes or openings which give to the lace the desired figures. For this operation much art is not necessary; and the invention of it is not so ingenious as that of weaving stockings. Knitting, however, is very tedious; and when the thread is fine and the pattern complex, it requires more patience than the modern refinement of manners has left to young ladies for works of this kind. Such labour, therefore, is consigned to the hands of indigent girls, who by their skill and dexterity raise the price of materials, originally of little value, higher when manufactured than has ever yet been possible by any art whatever. The price, however, becomes enormous when knit lace has been worked with the needle or embroidered: in French it is then called *points.*[*]

The antiquity of this art I do not pretend to determine with much certainty; and I shall not be surprised if others by their observations trace it higher than I can. I remember no passage in the Greek or Latin authors that seems to allude to it; for those who ascribe works of this kind to the Romans found their opinion on the expression *opus Phrygianum*: but the art of the Phrygians,[†] as far as I have hitherto been able to learn, consist only in needle-work; and those ingenious borders sewed upon clothes and tapestry, mention of which occurs in the ancients, cannot be called lace, as they have been by Braun[*] and other writers. I am however firmly of opinion that lace worked by the needle is much older than that made by knitting. Lace of the former kind may be found among old church furniture, and in such abundance that it could have been the work only of nuns or ladies of fortune, who had little else to employ their time, and who imagined it would form an agreeable present to their Maker; for had it been manufactured as an article of commerce, we must certainly have found more information respecting it.

---

[*] A complete account of this art may be found in the Paris edition of the *Encyclopédie,* fol. iv. p. 844; in *Encyclopédie methodique des manufactures,* par Roland de la Platiere, i. p. 236; *Diction. de commerce,* ii. p. 52; and *Jacobson's Schauplatz der zeugmanufacturen,* i. p. 125.

[†] This is proved by the *vestes Phrygioniæ* of Pliny mentioned before in the article on wire-drawing. Those who made such works were called *phrygiones.* In the *Menæchmi* of Plautus, act ii. scene 3, a young woman desirous of sending her mantle to be embroidered, says: Pallam illam ad phrygionem ut deferas, ut reconcinnetur, atque ut opera addantur, quæ volo. Compare *Aulul.* act iii. scene 5; *Non. Marcellus,* i. 10; and *Isidor.* 19, 22. The Greeks seem to have used the words κεντειν and καταστιζειν as we use the word *embroider.*

We read in different authors that the art of making lace was brought from Italy, particularly from Genoa and Venice, to Germany and France; but this seems to allude only to the oldest kind, or that worked with the needle, and which was by far the dearest. At any rate, I have no where found an expression that can be applied to lace wove or knit. In the account given of the establishment of the lace manufacture under Colbert in 1666, no mention is made but of *points*.[†]

---

[*] De vestitu sacerdot. Hebræorum, i. p. 212.

[†] Count de Marsan, the youngest son of count d'Harcourt, brought

I will venture to assert that the knitting of lace is a German invention, first known about the middle of the sixteenth century; and I shall consider as true, until it be fully contradicted, the account given us that this art was found out, before the year 1561, at St. Annaberg, by Barbara wife of Christopher Uttmann. This woman died in 1575, in the sixty-first year of her age, after she had seen sixty-four children and grand-children; and that she was the inventress of this art is unanimously affirmed by all the annalists of that part of Saxony.* About that period the mines were

---

from Brussels to Paris his former nurse, named Du Mont, with her four daughters, and procured for her an exclusive right to establish and carry on the lace manufactory in that capital. In a little time Du Mont and her daughters collected more than two hundred women, many of whom were of good families, who produced such excellent work that it was in little or nothing inferior to that imported from other countries. See *La vie de Jean-Bapt. Colbert*, seconde edit. A Cologne, 1696, 12mo. p. 154.

* The oldest information on this subject is to be found in *Annabergæ urbis historia, auctore Paulo Jenisio.* Dresdæ 1605, 4to. ii. p. 33. Hoc anno, 1561, filum album retortum in varias formas Phrygio opere duci cœpit, quod ut ad mediocrem ornatum adhibitum reprehendi minime potest, præsertim re metallica vehementer attrita, ita cavendum tamen, ne vanitati et luxuriæ serviat. I found the rest of my information in *C. Melzer, Berglauftige beschreibung der stadt Schneeberg.* Schneeberg 1684, p. 471. *Historia Schneebergensis.* Schneeberg 1716, 4to. p. 882. *Tob. Schmidt Chronici Cygnei pars posterior*, or *Zwickauische Chronik.* Zwickau 1656, 4to. ii. p. 384. *Christ. Lehmanns Historischer schauplatz des Obererzgebirges.* Leipzig 1699, 4to. p. 771.

less productive, and the making of veils, an employment followed by the families of the miners, had declined, as there was little demand for them. This new invention, therefore, was so much used that it was known in a short time among all the wives and daughters of the miners; and the lace which they manufactured, on account of the low price of labour, soon became fashionable, in opposition to the Italian lace worked with the needle, and even supplanted it in commerce.

A doubt, however, has often occurred to me, which may probably occur also to some of my readers, that this Barbara Uttmann may be entitled only to the merit of having made known and introduced this employment; and that, as has often happened to those who first brought a new art to their own country, she may have been considered as the inventress, though she only learned it in a foreign land, where it had been long practised. But I conjecture that this could not have been the case, as I find no mention of the art of knitting lace, nor any of the terms that belong to it, before the middle of the sixteenth century.

ULTRAMARINE.

ULTRAMARINE is a very fine blue powder, almost of the colour of the corn-flower or blue-bottle, which has this uncommon property, that, when exposed to the air or a moderate heat, it neither fades nor becomes tarnished. On this account it is used in painting; but it was employed formerly for that purpose much more than at present, as smalt, a far cheaper article, was not then known. It is made of the blue parts of the lapis lazuli, by separating them as much as possible from the other coloured particles with which they are mixed, and reducing them to a fine powder. The real lapis lazuli is found in the mountains of that part of Tartary called Bucharia, which extends eastwards from the Caspian sea,* and particularly at Kalab and Budukschu. It is sent thence to the East Indies, and from the East Indies to Europe. The Bucharians also carry fragments of it, weighing sometimes a pound and more, to Orenburg, though less frequently than some years ago.† As large pieces of a pure and beautiful colour are scarce even in that distant country, and as they are employed for making ornaments and toys, the rough stone itself is costly; and this high price is increased in the ultramarine by its laborious preparation, though in latter times the process has been rendered much easier.*

---

* Brunichs Mineralogie. St. Petersburg und Leipzig 1781, 8vo. p 112.

† Falks Beytrage zur topographischen kenntniss des Russischen Reichs. Petersburg 1786, 4to. vol. iii. Under the article of Minerals.

On account of the scarcity and great value of the lapis lazuli, other stones, somewhat like it only in colour, have been substituted in its stead; and hence have arisen the many contradictions to be found in the works of different authors, particularly those of the ancients, where they speak of the properties and country of this species of stone. Many have considered the Armenian stone, which is a calcareous kind of stone tinged with copper; many the mountain blue or malachite, and many also blue sparry fluor, and blue jasper, as the lapis lazuli;† and ultramarine of course is not always what it ought to be. At present, smalt of a good colour is often purchased therefore at a dear rate;

---

* The old method of preparing ultramarine may be found in *De Boot, Gemmarum histor.* Lugduni Bat. 1647, 8vo, p. 279. Various receipts from different books may be seen also in *Swedenborgii Lib. de cupro,* p. 465. Better directions are given in *Spielmanns Institut. chem.* p. 45; *Sages Chemische untersuchung verschiedener mineralien,* Gottingen 1775, 8vo. p. 13; and *Rinmanns Geschichte des eisens,* Berlin 1785, 8vo. ii. p. 142. Formerly ultramarine was improperly called a precipitate or magisterium.

† Besides the before-mentioned proofs of the real lapis lazuli being found in Tartary, the same thing is confirmed by Tavernier in *Beschreibung der sechs reisen,* ii. p. 148. *Paulus Venetus* also, in the edition of Helmstadt, p. 70, seems to speak of that country when he says: Suppeditat quoque mons alius in hac provincia

(Balascia) lazulum, de quo fit azurum optimum, quale etiam in mundo non invenitur. Elicitur autem ex mineris non secus ac ferrum; præbent quoque mineræ argentum. A great many however assert that this species of stone is brought from Persia: but it is not indigenous in that country, and is carried thither from Thibet. As the Persians are remarkably fond of this paint, they endeavour to procure as much of it as possible; but Persia itself produces only the blue copper ochre, which is sometimes used there instead of ultramarine. Tavernier mentions this very particularly, and, as he dealt in precious stones, was not liable to be deceived. To rectify a prevailing mistake, I shall here insert his own words, taken from his Travels, vol. ii. p. 242. "In the copper mines of Persia, veins of lazur, which is much used in that country, and with which the flowers on the ceiling and roofs of apartments are painted, have also been found. Before these were discovered, the Persians had no other lazur than the real kind which comes from Tartary, and is exceedingly dear. The Persian lazur is a sort of copper-ore; and when the stone is pounded and sifted, which is the process employed with the real kind, it forms a fine paint, which appears very bright and pleasant. After this discovery, the Persians durst no more purchase the Tartarian lazur; and Mahomet-Beg issued an order that painters should not use foreign but Persian lazur. This prohibition however did not long continue; for the Persian lazur could not stand the effects of the atmosphere like the real kind, but in the course of time became of a dark and dismal colour. Sometimes it was full of scales, and would not hang to the end of a soft hair brush. On this account it was soon neglected as a coloured earth, and the lazur of Tartary again introduced." This information is confirmed also by Chardin, in *Voyages en Perse*, iv. p. 66. "In the country around Tauris," says the author, "is found lapis lazuli, but it is not so good as that of Tartary, as its colour changes, becomes dark, and afterwards fades." In page 255, he says likewise, "The lapis lazuli, called *lagsverd*, from which we have formed the word *azur*, is found in the neighbourhood, in the country of the Yousbecs, but the general magazine for it is Persia." I do not believe that this and it is in greater request, as it is certain that its colour is more durable in fire than even that of the lapis lazuli. Good ultramarine must be of a beautiful dark colour, and free from sand as well as every other mixture. It must unite readily with oil; it must not become tarnished on a red-hot tile or plate of iron, and it ought to dissolve in strong acids, almost like the zeolite, without causing an effervescence. In the year 1763, an ounce of it at Paris cost four pounds sterling, and an ounce of *cendre d'outremer*, which is the refuse, two pounds. At Hamburgh, Gleditsch sold fine real Oriental ultramarine for a ducat per ounce, and warranted it to stand proof by fire; but whether it would stand proof by acids also, I do not know.

From what has been said, a question arises, whether ultramarine was known to the ancient Greeks and Romans? And this gives occasion to another, whether they were acquainted with lapis lazuli? The name lapis lazuli no one indeed can expect to find among them; for it is certain that we received it from the Arabians; and the

---

species of stone was formerly procured from Cyprus, as is asserted in many books. Copper is a production of that island, and it produces even at present mountain blue. Those also who assert that the colour of ultramarine fades in the fire, must not have been acquainted with the genuine sort. See *Schriften der Schwedischen Acad.* xii. p. 69. Montamy, in *Abhandlung von den farben zum porzellan*, Leipzig 1767, 8vo. p. 121, affirms that ultramarine is not good for enamel-painting, but it is certain that it was once used for that purpose.

word *ultramarinum* is altogether barbarous Latin. Some centuries ago, many foreign articles, brought from beyond sea, had a name given them from that circumstance; and the ancients applied the epithet *marinum* to various productions on the like account. Hence, in the decline of the Roman language was formed *ultramarinum*, which some have endeavoured to improve by changing it into *transmarinum*, but this among the ancients never signified a paint.

Though the ancient names of precious stones have neither been examined with sufficient accuracy nor distinguished with the greatest possible certainty, I think I can discover among them the lapis lazuli. I consider it as the sapphire of the ancients, and this opinion has been entertained by others; but I hope to render it more probable than it has hitherto appeared. In the first place, the sapphire of the Greeks and Romans was of a sky-blue colour, with a violet or purplish glance; and sometimes it had a very dark or almost blackish blue colour. Secondly, this stone was not transparent. Thirdly, it had in it a great many gold points, or golden-yellow spots, but that which had fewest was most esteemed. Fourthly, it was polished and cut; but when it was not perfectly pure, and had mixed with it harder extraneous particles, it was not fit for the hands of the lapidary. Fifthly, it appears that it was procured in such large pieces that it could be employed for inlaid or mosaic-work. Sixthly, it was often confounded with, or compared to, copper-blue, copper-ore, and earth and stones impregnated with that metal. Seventhly, such medicinal effects were ascribed to it as could be possessed only by a copper calx; and lastly, it formed veins in rocks of other kinds of stone, as we are informed by Dionysius.*

---

* Reddetur et per se cyanos, accommodata gratia paulo ante nominato colore cæruleo.—Inest ei aliquando et aureus pulvis, non qualis in sapphiris. In sapphiris enim aurum punctis collucet cæruleis. Sapphirorum, quæ cum purpura, optimæ apud Medos; nusquam tamen perlucidæ. Preterea inutiles scalpturæ, intervenientibus crystallinis centris. Quæ sunt ex iis cyanei coloris, mares existimantur. *Plin.* lib. xxxvii. cap. 9. Coralloachates guttis aureis sapphiri modo sparsa. *Ibid.* cap. 10. Sapphirus cæruleus est cum purpura, habens pulveres aureos sparsos; apud Medos optimus, nusquam tamen perlucidus. *Isidori orig.* xvi. 9. Ἡ σαπφειρος. αυτη δ᾽ εστι ὡσπερ χρυσοπαστος. Theophrast. de lapid. § 43. Sapphirus lapis ictis a scorpione potu prodesse existimatur. Bibitur et contra intestinas exulcerationes. Extuberantia in oculis eorumque uvas et pustulas reprimit; sed et ruptas eorundem membranas cogit atque glutinat. *Dioscorides*, v. 157. Passim item sub rupibus subtus venæ pariunt aureæ cæruleæque pulcrum lapidem sapphiri, χρυσειης κυανης τε καλην πλακα σαπφειροιο. *Dionys. Orb. Desc.* v. 1105. Sapphirus gemma purpurascit, ut species blattæ, id est, purpuræ nigræ. Multa sunt ejus genera. Est enim regius, aureis punctis varius χρυσοστιγης. Non est vero hic in tanta admiratione, quanta ille, qui prorsus purpurascit. Et hic dicitur esse cum in India, tum in Æthiopia. Quocirca aiunt apud Indos templum extructum Baccho extare, quod gradus ex sapphiro trecentos sexaginta quinque habeat, quamvis multi fidem non adhibeant. Est vero gemma admirabilis, pulcerrima, gratissima; propterea etiam in armillis et monilibus reponi consuevit, idque potissimum a regibus. Locum etiam inter remedia habet. Atrita enim et lacti permixta plagi quæ fiunt ex pustulis albis et tuberculis medetur, si illis illinatur *Epiphanius* de xii gemmis, § 5.

That a stone with these properties cannot be the sapphire of our jewellers is beyond all doubt. Our real sapphire does not form veins in other fossils, but is found among sand in small crystals, shaped like diamonds; though they sometimes have rather the figure of columns, and perhaps the real sapphires are nothing else than blue diamonds. Like other precious stones, they are always transparent; they have never gold points in them; their blue colour resembles more or less that of blue velvet, and it is often very pale, and approaches seldom, or very little, to purple. Powder of sapphire appears like fine pounded glass, exhibits no traces of copper, and can in no manner produce a blue paint, or be confounded with mountain-blue.

The question, whether the ancients were acquainted with our sapphire, and whether it may not belong to their amethysts or hyacinths, I shall not here examine. I am inclined rather to decide in the negative than the affirmative; and at any rate the proof will always remain dubious. It might perhaps be difficult also to determine whe-

Sapphiri species digitis aptissima regum,
Egregium fulgens, puroque simillima cœlo,
Vilior est nullo virtutibus atque decore.
Hic et syrtites lapis a plerisque vocatur,
Quod circa Syrtes Lybicis permixtus arenis,
Fluctibus expulsus fervente freto reperitur.
Ille sed optimus est quem tellus Medica gignit,
Qui tamen asseritur nunquam transmittere visum.
Marbodeus de lapidibus, 53, p. 46.

ther every modern mineralogist who has spoken of the sapphire was acquainted with, and alluded to, the real stone of that name.

On the other hand, we can affirm with the greatest certainty, that the sapphire of the ancients was our lapis lazuli. The latter is of a blue colour, which inclines sometimes to violet or purple, and which is often very dark. It is altogether opake, yet its colour will admit of being compared to a sky-colour; in mentioning of which Pliny had no idea of transparency, for he compares the colour of an opake jasper to a sky-blue.* The lapis lazuli is interspersed with small points, which were formerly considered as gold, but which are only particles of pyrites or marcasite. It can be easily cut and formed into articles of various kinds, and at present it is often used for seals. Pliny, however, informs us, that it was not fit for this purpose when it was mixed with hard foreign particles, such as quartz; and that which was of one colour was therefore much more esteemed.† Many cut stones of this kind, which are considered as antiques, may be found in collections.* I remember to have seen several works of this sort in the excellent collection of the duke of Brunswick, which, in all probability, are Egyptian, and which are worthy of an accurate description. That lapis lazuli was used formerly for inlaid works I am well convinced, though at present I can produce no proofs. In how beautiful a manner it is employed for that purpose in Florentine works, is well known. The largest and most magnificent squares of lapis lazuli which I ever saw, are in the apartments at Zarskoe-Selo, a summer palace near Petersburg, belonging to the empress of Russia, the walls of which are covered with amber, interspersed with plates of this costly stone. I was informed that these plates were procured from Thibet. The doubt expressed by Epiphanius concerning stairs overlaid with lapis lazuli, respects only the great expense of it, and he perhaps imagined that the steps were entirely cut from the solid stone. The confounding the sapphire with the *cyanus*, or comparing it to it, of which several

---

* Lib. ii. p. 782: Jaspis aërizusa—which I certainly do not, with Saumaise, consider as the turquoise. We have blue jasper still.

† *Plin.* Inutiles scalpturæ, intervenientibus chrystallinis centris.—Several learned men have understood this passage, as if Pliny said that the sapphire could not be cut; but they seem not to have attended properly to the author's words, and to have forgot what the ancient artists called *centra* in stones and different kinds of wood which were to be cut. This Pliny himself explains, b. xvi. c. 39. Inveniuntur in quibusdam, sicut in marmore, centra, id est duritia

---

clavo similis, inimica serris. In b. xxxvii. c. 2, he reckons also "prædurum ac fragile centrum" among the faults of rock crystal, which however, when it had not this blemish, was very proper for being cut. Theophrastus uses in the same sense the word κεντρον.

* See Christs Verzeichniss zu Lipperts Dactyliotheca, p. 48, 62, 65, 97. ii. p. 11, 20, 29. iii. p. 13, 56.

instances occur, proves that the former must have had a great resemblance to copper-ore; for that the *cyanus* is a kind of mineral or mountain blue, tinged with copper, I have proved already.[*] The blue colour of lapis lazuli has always been supposed to be owing to copper; but according to the latest discoveries it originates from iron.[†] The medicinal effects which the ancients ascribed to their sapphire could be produced only from a mixture of copper, as they considered the Armenian stone, or false lapis lazuli, to be the real kind. They recommended copper ochre for an inflammation of the eyes.[‡] In the last place it agrees with what Dionysius says, that the sapphire or lapis lazuli was produced in veins among other kinds of stone.[§] The sapphire also mentioned in the oldest writings of the Hebrews, appears to be no other than the sapphire of the

---

[*] Aristotelis Auscultat. mirabil. cap. 59. p. 123.

[†] The colour of iron ochre however is very liable to be changed by fire: but may it not be more durable when mixed in a certain manner? Wallerius is of opinion that the blue colour proceeds from silver. *Systema mineralium*, i. p. 313.

[‡] Dioscorides, Parabil. i. p. 10, 11, recommends *ιος* and *χαλκου ανθος*.

[§] Some years ago my former colleague, H. Laxman, discovered lapis lazuli in veins of granite near Baikal in Siberia. These veins contained also along with it feldspat (*spathum scintillans*) and a milky-coloured, perhaps zeolite, kind of stone, like sulphureous pyrites. See *Beobachtungen und entdeckungen der Berliner naturf. geselsch* i. p. 402.

Greeks, or our lapis lazuli; for it was said likewise to be interspersed with gold points.*

The ancients therefore were acquainted with our lapis lazuli; but the question whether they used it as a paint, or prepared ultramarine from it, I cannot answer with sufficient certainty. It is possible that their *cæruleum* sometimes may have been real ultramarine; but properly and in general it was only copper ochre.† The objection that the ancients made blue glass and blue enamel, and if they had not smalt they could use no other pigment that would stand fire but ultramarine, I shall answer in the next article.

Before I proceed to the oldest information with which I am acquainted respecting ultramarine, or the blue colour made from lapis lazuli, I shall communicate what I know of the origin and antiquity of the name commonly given to this stone. That I might be able to offer something more on the subject than what has been said by Saumaise,‡ I requested the opinion of professor Tychsen, which, with his permission, I have here subjoined.§ It is, in the first place, certain that the word is of Persian derivation, and the stone, as I have already remarked, has hitherto been brought to us from Persia. Secondly, it signifies a blue colour. It was at first also the common name in Europe for blue stones and blue colours used in painting; and it was a long time used to express mountain-blue impregnated with copper. The modern systematic mineralogists, it appears, first appropriated the corrupted Persian word to the present lazurstone, properly so called; and those therefore would commit an error in mineralogy who should now apply this name to the Armenian stone, mountain-blue, or any other blue mineral combined with copper.

---

* Braun de vestitu sacerdotum, ii. p. 530. See Michaelis *Supplementa ad lexica Hebraica,* num. 1775, from p. 1798 to 1800. The name sapphire is very ancient.

† Plin. lib. xxxiii. cap. 13. Compare *Aristot. Auscult. mirab.* p. 123.

‡ De homonymis hyles iatricæ. Trajecti ad Rhenum 1689, fol. p. 217.

§ *Lazul* or *lazur* is not of Arabic but Persian extraction. *Lad-*

Without pretending to have discovered the first mention of the name lazuli in those writings which have been handed down to us, I shall here offer, as the oldest with which I am acquainted, that found

---

schuardi or *lazuardi* in Persian signifies a blue colour and lapis lazuli. It ought properly to be pronounced *lasuverd*; but the Arabs in their pronunciation contract the *v* very much, so that it sounds like *u*; and one can say therefore *lazurd*. The derivative *lasurdi* or *lasuverdi* signifies *blue*.

The pronunciation *lazul*, with an *l* at the end, is agreeable to the common custom among the Arabs of confounding *l* and *r*; as instead of *zingiber* they say *zengebil*. The initial *l* is not the article, but seems to belong to the word itself, because it is not originally Arabic. It is worthy of remark, that the Spaniards call blue, *azul*, which is plainly derived from the above word; and the *l* has been omitted because it was considered as the article, and thus the word was mutilated, as is often the case with foreign words among the Arabs, who say, for example, *Escandria*, instead of *al Escandria* (*Alexandria*).

in Leontius,[*] who, where he gives directions for colouring a celestial globe, speaks of *lazurium.* If Fabricius be right, Leontius lived in the sixth century.[†] Among the receipts for painting, written in the eighth century, which Muratori[‡] has made known, we find an unintelligible account how to make *lazuri*, for which *cyanus compositus*, perhaps a prepared kind of mountain-blue, was to be employed. There is also another receipt which orders blue-bottles to be pounded in a mortar. It appears therefore that this word was used in the corrupted Latin of that period to signify a blue colour for painting. The same word, formed after the Greek manner, seems to have been used for blue by Achmet, the astrologer, who lived in the ninth century,[§] and by Nonus in the tenth for a blue earth.[‖] Of still more importance is a passage of Arethas, who lived in the following century, and who, in his exposition of a verse in the book of Revelation,[*] says, The sapphire is that stone, of which *lazurium*, as we are told, is made.[†] This, therefore, is a strong corroboration that the sapphire of the ancients was our *lapis lazuli*, and appears to be the first certain mention of real ultramarine. The word however occurs often in the succeeding centuries for blue copper-ochre. Constantinus Africanus, a physician of the eleventh century, ascribes to lapis lazuli the same medicinal qualities as those of copper-ochre;[‡] as do also Avicenna, Averroes, and Myrepsius. The first, under the letter *lam*, gives a chapter entitled *lazuard*, to which the translator has prefixed *De azulo, id est, de lapide Armenio*; and the last says expressly, that the *lapis lazuli* of the Latins is the *lazurios* of the Greeks.[§] The words *azura*,

---

[*] Coloretur atque incrustetur sphæra gypso aut cerussa, si lignea est, ut ejus rimulæ et lacunculæ, si quæ fuerint, compleantur complanenturque. Post, siccato hoc colore, alioque ei crassiore inducto, qualis est quem lazurium vocant. Και αλλῳ βαθει τινι χρωματι επαλειψαντες, οιον τῳ καλουμενῳ λαζουριῳ. Leontius de constructione Arateæ spheræ, p. 144. Leontius may be found in the Collection published by Joh. Commelin: *Astronomica veterum scripta*, 1589, 8vo.

[†] Biblioth. Græca, ii. p. 456.

[‡] Antiquitat. Ital. medii ævi, ii. p. 372. 378.

[§] Introductio in Astrolog. Ὑγρος εστι, και χροιαν του λαζουριου εχει.

[‖] Nonus de morb. curat. cap. 143: ἢ την Αρμενιαν βωλον πινειν ἢ τον λαζουριον.

---

[*] Chap. xxi. ver. 19.

[†] Εξ οὑ Σαπφειρου φασι και το Λαζουριον χρωμα γινεσθαι. The exposition of Arethas is printed with Œcumenii Commentaria in Novum Testamentum. Lutetiæ Paris. 1630, 1631, 2 vol. fol.

[‡] Lapis lazuli frigidus. Si in collyriis mittatur, oculis proficit. Palpebrarum pilos confortat, capillos confirmat et multiplicat - - - Lotus et propinatus, vomitum sine omni angustia provocat. *De gradibus, quos vocant simplicium*, p. 362. These words serve to explain and confirm further what I have said respecting *Aristotelis Auscultat. mirab.* cap. 59, where we are told that copper-ochre promotes the growth of the hair and of the eye-brows. The works of Constantinus were printed at Basle 1536-1539, in two folio volumes.

[§] Λαπις λαζουλι, τουτεστι λιθος λαζουριος.—Matth. Silvaticus says: *Lapis lazuli* Latinis, Arabibus *Hager alzenar* sive *alzanar*; and also: *Lauzud*. Arab. Azurinum, lapis lazuli.

azurum, *azurrum*, occur often also in that century for *blue*.

The name *ultramarine*, or, as it was first called, *azurrum ultramarinum*, I have not yet found in any writer of the fifteenth century. But it appears that it must have been common about the end of that century, as it was used by Camillus Leonardus in 1502.* It is probable that it originated in Italy. In the first half of the sixteenth century Vanuccio Biringoccio gave directions for preparing the real ultramarine, which he distinguishes with sufficient accuracy from copper azur, † or, as he

---

* Zumemellazuli sive Zemech, Latine vero lapis lazuli. - - - Ex eo fit color vocatus azurrum ultramarinum. *Speculum lapidum.* Hamburgi 1717, 8vo. p. 125.

† Of azur there are two sorts, one called by painters *azurro oltramarino*, and the other *azurro dell' Alemagna*. The ultramarine is that made of the stone known by the name of lapis lazuli, which is the proper matrix of gold-ore. This stone, after being pounded and washed, is reduced to an impalpable powder. It is then brought back to its lively and beautiful colour by means of a certain paste composed with gum, and is refined and freed from all moisture. This kind is that most esteemed; and according to its colour and fineness is purchased at a high price by painters; for it not only adds great beauty to paintings, but it withstands fire and water—two powers which other colours are not able to resist. *Pirotechnia*, p. 38. The German azur of Biringoccio is not smalt; for he describes that colour before under the name of *zaffera*.

Fallopius, who in 1557 wrote his book *De metallis seu fossilibus*, says, chap. xxxiii. p. 338: Cæruleus etiam vocatur lapis lazuli et lazurium ab Avicenna, et vulgo nominatur a pictoribus azurium ultramarinum, et dicitur azurium, vel *azurro*, a lapide lazuli; dicitur porro ultramarinum, quia defertur ex locis ultra mare, ut ex Cypro. Est pretiosi genus coloris, et caro admodum venditur, nam una

calls it, the *azurro dell' Alemagna*. At that period, however, the best method of preparing it must have been doubtful as well as little known, and on that account of no great benefit; for, in the beginning of the sixteenth century, the father of the celebrated Giambatista Pigna, an apothecary at Modena, was in possession of the secret for making the best ultramarine, by which he acquired more riches than would have arisen from a large estate.* It is not, therefore, altogether true that Alexius Pedemontanus, as Spielmann relates,† was the first person who mentioned ultramarine. I am of opinion that this Alexius, or Hieronymus Ruscellai concealed under that name, who wrote in the beginning of the sixteenth century, only first published

uncia venditur centum scutatis aureis; venditur autem ita caro pretio, tum quia est venustissimus et pulcerrimus color, igni et fumo resistens; ita ut pictura ex hoc colore non inficiatur a fumo, immo reddatur magis colorata et pulcra; tum propter præparationem difficillimam et longam, quæ requiritur in præparando tali colore.

---

* As young Pigna applied too closely to study, Bartholom. Ricci, in a letter still extant, advised him to be more moderate, as he was not compelled by necessity to labour so hard. "Solus es, *says he*, in re bene ampla. Prædia enim tibi non desunt, villæ atque ædes in urbe; supellex nobilissima; pater præterea est, qui tibi pro centum prædiis esse potest, qui vel uno cæruleo colore, quod nostri ultramarinum appellant, conficiendo (ut in pharmacis componendis ejus scientiam atque uberrimum fructum omittam) solus est qui perfectam scientiam habeat, ingentes copias comparare potest, atque adeo quotidie non parvas comparat. *Riccii Opera*, vol. ii. p. 336; and *Tiraboschi Bibliotheca Modenese*. In Modena 1783, 4to. vol. iv. p. 134.

† Institut. chemiæ, p. 45.

a complete account of the method of preparing it. At any rate, his receipt has been always followed since that time as the best and the most certain.* But on what information is that assertion founded, which we read in English and French authors,* that the preparation of ultramarine was found out in England, and that a servant of the East-India company disclosed it, in order to be revenged for some injury which he had sustained?

---

* The work of Alexius Pedemontanus *De Secretis* is no contemptible source from which materials may be drawn for the technological history of Inventions; and on this account it will perhaps afford pleasure to many if I here give an account of the author, according to such information as I have been able to obtain. Conrade Gesner seems not to have known any thing of him, as appears by his letters, written in 1564. See *Epistolæ medicinales*, p. 50; nor has he mentioned him in his *Bibliotheca*. It is said in *Syllabus scriptorum Pedemontii, opere et studio Andreæ Rosotti a Monteregali*, Monteregali 1667, 4to. p. 4. that it is not known when and where this pseudonymous author lived. But Ciaconius, in *Bibliotheca libros et scriptores fere cunctos complectens*, Parisiis 1731, fol. p. 94, says that his real name was Hieronymus Ruscellai. The same account is given by Haller in *Biblioth. botan.* i. p. 325; and in *Biblioth. practica*, ii. p. 119; only he is called H. Rossellus. Gobet, in *Les anciens minéralogistes de France*, Paris 1779, 8vo. ii. p. 705, tells us that this Jerome Ruscelli died in 1565; and that his book was composed from his papers by Franc. Sansovino, who published many works not his own, and printed, for the first time, at Milan in 1557. I have no where found a particular account of this Ruscelli; and indeed it is always laborious to search out any of that noble family, of which I have already spoken in the article on Lacmus. He appears to me to be none of those mentioned in *Jochers Gelehrtenlexicon*. I have met with no earlier edition of his works than that of 1557: but I suspect that the first must be older. However much the book may have been sought after, it seems to me improbable that three editions should be published in Italian in the course of the first year, for, besides that of Milan, two editions printed at Venice the same year, one in quarto and another in octavo, are still extant. A French translation also was published at Antwerp in 1557. Is it possible that an English translation could be published at London in 1558, if the original appeared for the first time in 1557? At that period translations could not be made so speedily. *The Secrets of*

Alexis, London 1558, is mentioned in *Ames's Typographical antiquities*, p. 296. I have in my possession a French translation by Christofle Landré, Paris 1576, 12mo, which I seldom find quoted. It has a large appendix, collected from various authors.

It is well known that Joh. Jacob Wecker, a physician at Colmar, translated into Latin this book of Alexius, and enlarged it with additions, under the title of *De secretis libri* xvii. The first edition, as Haller says, was printed at Basle in 1559, 8vo. Every edition seems to differ from the preceding; many things are omitted, and the new additions are for the most part of little importance. I have the edition of Basle, 1592, 8vo. in which there is a great deal not to be found in that of 1662, and which wants some things contained in the edition of 1582. The latest editions are printed from that improved by Theod. Zwinger, Basle, 1701, 8vo. See *J. J. Scheuchzeri Nova litteraria Helvetica.* Tiguri 1703, 8vo. The last edition of this work by Zwinger was published at Basle in 1753, which Haller has forgot to remark in his *Bibl. botan.* ii. p. 31. Though these books on the arts, as they are called, contain many falsehoods, they are still worthy of some notice, as they may be reckoned among the first works printed on technology, and as they have as much induced learned men to pay attention to mechanics and the arts as they have artists to pay attention to books and written information. That researches of this kind, however, may appear tedious and not suited to the modish taste, I am well aware; but those who wish to illustrate the history of Inventions must not be disgusted with such labour; and I shall introduce them in future with a very sparing hand.

* See Savary, Dictionnaire de commerce, art. Outremer, which has been copied into Rolt's Dictionary of trade, London 1756. fol.

COBALT, ZAFFER, SMALT.

THE name cobalt is given at present to such minerals as contain that semi-metal, the calx of which can be melted into blue glass, and which communicates a blue colour to common glass. As the metal itself is fit for no particular purpose, the calx only is used. The cobalt is first roasted and freed from the foreign mineral bodies, particularly bismuth and arsenic, with which it is united: it is then well calcined, and sold, either mixed or unmixed with fine sand, under the name of zaffer (*zaffera*); or it is melted with siliceous earth and potashes to a kind of blue glass called smalt, which, when ground very fine, is known in commerce by the name of powder-blue. All these articles, because they are most durable pigments, and those which best withstand fire, and because one can produce with them every shade of blue, are employed, above all, for tingeing crystal and for enamelling; for counterfeiting opake and transparent precious stones, and for painting and varnishing real porcelain and earthen and potters' ware. This colour is indispensably necessary to the painter when he is desirous of imitating the fine azure colour of many butterflies and other natural objects; and the cheaper kind is employed to give a blueish tinge to new-washed linen, which so readily changes to a disagreeable yellow, though not without injury to the health, as well as to the linen.

The preparation of this new colour may be reckoned among the most beneficial inventions of modern times. It rendered of importance an useless and hurtful production; gave employment to a number of hands; assisted in bringing many arts to a degree of perfection which they could never before attain; and has drawn back to Germany a great deal of money which was formerly sent out of it for foreign articles.

Though there is no doubt that the process used in the preparation of cobalt and smalt was invented about the end of the fifteenth or the beginning of the sixteenth century, we have reason to ask whether the ancients were acquainted with cobalt, and if they employed it for colouring glass. They opened and worked mines in various parts; and it is, at any rate, possible that they may have found cobalt; they made many successful attempts to give different tints to glass.* and they produced blue glass and blue enamel. They may have learned by an accident to make this glass, as they did to make brass; and they may have continued to make the former as long as their supply of coloured earth lasted. When the mineral failed them, they may have lost the art, in the same manner as the method of preparing Corinthian brass* was lost for a considerable space of time. The use of cobalt does not imply a knowledge of its metal; for the moderns made brass and smalt for whole centuries, before they learned to prepare zink and regulus of cobalt.

---

* See what is said in the first volume, under the article *Artificial Rubies*.

It seems, however, difficult to answer this question; for one can scarcely hope to discover cobalt with any certainty among those minerals mentioned by the ancients. They could describe minerals in no other manner than according to their exterior appearance, the country where they were found, or the use to which they applied them. Now there is no species more various and more changeable in its figure and colour than cobalt, which on this account shows the impossibility of distinguishing minerals with sufficient accuracy by external characteristics. Besides, there are scarcely two passages of the ancients which seem to allude to it; and these, when closely examined, give us little or no information.

The meaning of the term *cadmia* is as various and uncertain as that of the word *cobalt* was two centuries ago. It signified often calamine; sometimes furnace-dross; and perhaps, in later times, also arsenic; but, as far as I know, it was never applied to cobalt till mineralogists wished in modern times to find a Latin term for it,* and assumed that which did not belong properly to any other mineral. The well-known passage of Pliny,† in which Lehmann thinks he can with certainty distinguish cobalt, is so singular a medley that nothing to be depended on can be gathered from it. The author, it is true, where he treats of mineral pigments, seems to speak of a blue sand which produced different shades of blue paint, according as it was pounded coarser or finer. The palest powder was called *lomentum*; and this Lehmann considers as our powder-blue. I am, however, fully convinced that the *cyanus* of Theophrastus, the *cœruleum* of Pliny, and the *chrysocolla*,* were the blue copper earth, often already mentioned, which may have been mixed and blended together. Besides, Pliny clearly adds to it an artificial colour, which in my opinion was made in the same manner as our lack; for he speaks of an earth which when boiled with plants, acquired their blue colour, and which was in some measure inflammable. With these pigments walls were painted; but as many of them would not endure lime, they could be used only on those which were plastered with clay (*creta*). The expression *usus ad fenestras* has been misapplied by Lehmann, as a strong proof of his assertion; for he explains it as if Pliny had said that a blue pigment was used for painting window-frames; but glass windows were at that time unknown. I suspect Pliny meant to say only that one kind of paint could not be employed near openings which afforded a passage to the light, as it soon decayed and lost its colour. This would have been the case in particular with lacks, in which there was a mixture of vegetable particles.

---

* See the annotations on *Arist. Auscult. mirab.* p. 98.

---

* I am of opinion that this Latin name for cobalt was first used by Agricola.

† Cœruleum arena est. Hujus genera tria fuere antiquitus: Ægyptium, quod maxime probatur. Scythicum, hoc diluitur facile; cumque teritur, in quatuor colores mutatur, candidiorem, nigrioremve. Præfertur huic etiamnum Cyprium. Accessit his Puteolanum et Hispaniense, arena ibi confici cœpta. Tingitur autem omne, et in sua coquitur herba, bibitque succum. Reliqua confectura eadem, quæ chrysocollæ. Ex cœruleo fit quod vocatur lomentum; perficitur id lavando terendove; hoc est cœruleo candidius.—Usus in creta, calcis impatiens. Nuper accessit et Vestorianum, ab auctore appellatum. Fit ex Ægyptii levissima parte. - - Idem et Puteolani usus, præterque ad fenestras; vocant cœlon. Non pridem apportari et Indicum est cœptum. Cœrulei sinceri experimentum in carbone ut flagret. *Lib.* xxxiii. *cap.* 13. This, in part, is taken from *Theophrast. de lapid.* § 97; but I shall quote only the translation. Cœruleum (κυανος) unum est nativum, alterum artificiosum, ut in Ægypto. Genera enim cœrulei tria, Ægyptium, Scythicum, et Cyprium. Optimum autem Ægyptium ad meraciores inductiones; Scythicum autem ad dilutiores. Factitium autem Ægyptium. Et qui scribunt de regibus, hoc etiam scribunt, quis regum primus artificiale cœruleum fecerit, nativum imitatus.—Aiunt qui pigmenta terunt, cyanum ex se facere quatuor colores; primum ex tenuissimis partibus candidissimum; secundum vero ex crassissimis nigerrimum. Hæc autem arte fiunt; quemadmodum et cerussa.

For my part, I find in this passage as few traces of smalt as Mr. Gmelin; and I agree with him in opinion that the strong and unpleasant mixtures arising from cobalt would, had it been known, have induced the ancients to make particular mention of it in their writings. Would not the arsenic, which is so often combined with cobalt, have given occasion to many reports respecting the dangerous properties of these minerals? And would not arsenic and bismuth have been sooner known, had preparations of cobalt been made at so early a period? It is a circumstance of great weight also, that in the places where the ancients had mines, and where antiquities painted or tinged blue, and resembling in colour that produced by cobalt, have been dug up, cobalt has not been discovered, or has been discovered only in modern times. At present we know nothing of Egyptian, Arabian, Ethiopian, Italian, and Cyprian cobalt; and in Spain* this mineral was first found in the reign of Philip IV. I shall here observe, that the island of Cyprus was formerly so abundant in copper that, in a mineralogical sense, it might be called the island of Venus; and we can therefore entertain the less doubt that the *cæruleum Cyprium* was copper-blue.

---

* Aristot. Auscult. mirab. p. 123.

The principal reason, however, why Lehmann, Paw,† Ferber, Delaval, and others, think that the ancients used smalt, and were acquainted with cobalt, is, that, as has been already said, various antiquities both of painting and enamel have been discovered, in which a blue appears that seems to give grounds for conjecturing that it was produced by cobalt. Ferber* speaks of blue glass squares in mosaic-work; and Delaval mentions old Egyptian glass-work of this colour.†. It is well known also that the Chinese and people of Japan gave to their porcelain that fine blue colour, for which it is celebrated, long before the discovery of smalt in Europe. On mummies a blue is seen likewise, which, even after so many centuries, seems to have lost little or nothing of its beauty. We must therefore allow that the ancients used either ultramarine or cobalt.

---

* Bowles, Introducion à la historia natural y à la geographia fisica de España. Madrit 1775, p. 399.

† Recherches philosophiques sur les Egyptiens et les Chinois.

The first opinion seems, in regard of porcelain, to be confirmed by Duhalde,‡ who speaks of a mine of *azur*, and relates that the Chinese, in modern times, use instead of it, for painting their por-

---

Berlin 1773, i. p. 345. An experimental inquiry into the cause of the changes of colour in opake and coloured bodies, by E. H. Delaval. London 1774, 4to. p. 56.

* Briefe aus Welschland. Prag 1773, 8vo. p. 114, 186, 223.

† Blue enameled figures of the Egyptian deities may be found in *Marb. antiq. dans la gallerie de Dresde*, tab. 190.

‡ Description de l'Empire de la Chine et de la Tartarie Chinoise. A la Haye 1736, ii. p. 223, 230, 232. I have, however, often heard, and even remarked myself, that the blue on the new Chinese porcelain is not so beautiful as that on the old.

celain, a blue paint brought from foreign countries. It is probable that by the former he means lapis lazuli, and by the latter smalt, which is sent, in large quantities, from Europe to China. The invention of ultramarine, however, appears to me too new, its effect on porcelain too uncertain, and its price too high to allow us to suppose that it has been much used. We should therefore have been almost obliged to adopt the latter opinion, had not Mr. Gmelin proved by chemical experiments* that it is not only possible to give to glass and enamel a blue colour by means of iron; but that the before-mentioned antiquities, upon which so much stress has been laid, show not the smallest traces of cobalt. He even made experiments upon blue tiles, found in a Roman tessellated foot-pavement at Montbeillard; and likewise on the blue paint of the mummy which was presented to our university by the king of Denmark.† He has also mentioned various articles on which a blue colour is produced by the vitrification of iron. Of this nature are in particular those slags found near the smelting-houses at the iron-mines of the Harze forest; and I myself have seen slags which were of a blue colour exceedingly beautiful. Vulcanic slags, or scoriæ, found in the neighbourhood of Verona, Vicenza, and other parts of Italy, are mentioned also by Ferber,* which seems to confirm the conjecture of Dr. Bruckmann,† that the ancients may have used such slags for their works. It is probable that the ancients were first induced by the blue slag of their smelting-houses to make experiments on the colouring of glass with iron, and that in this art they acquired a dexterity not possessed at present, because it was abandoned by our ancestors after the invention of smalt, which is much more beautiful; and which can be used more easily and with more certainty. I cannot, however, deny that I have often lamented this loss when I saw the excellent blue in the painted windows at Gouda, Goslar, and other places; though its beauty is much heightened by the transparency of the glass, and the strong light that falls upon it from without.

---

* De cæruleo vitro in antiquis monumentis, in *Commentationes Societatis Gottingensis*, 1779, vol. ii. p. 41.

† See *Commentat. societ. Gottin.* 1781, vol. iv. p. 20.

I shall now proceed to the invention of the paint prepared from cobalt. About the end of the 15th century, cobalt appears to have been dug up in great quantity in the mines on the borders of Saxony and Bohemia, discovered not long before that period. As it was not known at first to what purpose it could be applied, it was thrown aside as a useless mineral. The miners had an aversion to it, not only because it gave them much fruitless labour, but because it often proved prejudicial to their health by the arsenical particles with which it was combined; and it appears even that the mineralogical name *cobalt* then first took its rise. At any rate, I have never met with it before the beginning of the sixteenth century; and Mathesius and Agricola seem to have first used it in their writings. Frisch derives it from the Bohemian word *kow*, which signifies metal; but the conjecture that it was formed from *cobalus*, which was the name of a spirit that, according to the superstitious notions of the times, haunted mines, destroyed the labours of the miners, and often gave them a great deal of unnecessary trouble, is more probable; and there is reason to think that the latter is borrowed from the Greek. The miners, perhaps, gave this name to the mineral out of joke, because it thwarted them as much as the supposed spirit, by exciting false hopes and rendering their labour often fruitless.* It was once customary, therefore, to introduce into the church service a prayer that God would preserve miners and their works from *kobolts* and spirits.

---

* Briefe, p. 30.

† Beytrage zu der abhandlung von edelsteinen. Brunswick 1778, 8vo. p. 55.

---

* Mathesius, in his tenth Sermon, p. 501, where he speaks of the *cadmia fossilis*, says: " Ye miners call it *kobolt*; the Germans " call the black devil and the old devil's whores and hags old and " and black *kobel*, which by their witchcraft do injury to people " and to their cattle." - - - Whether the devil, therefore, and his hags gave this name to cobalt, or cobalt gave its name to witches, it is a poisonous and noxious metal. *Agricola De animantibus subterraneis*, says, at the end: Dæmones, quos Germanorum alii, aut etiam Græci, vocant cobalos, quod hominum sunt imitatores. Bochart, in his *Canaan*, i. 18, p. 484, gives a Hebrew derivation of κοϐαλος. It appears to be the same as *covalus* and *gobelinus*, the latter of which was used by Ordericus Vitalis in the eleventh century

Respecting the invention of making an useful kind of blue glass from cobalt we have no better information than that which Klotzsch* has published from the papers of Christian Lehmann. The former, author of an historical work respecting the upper district of the mines in Misnia, and a clergyman at Scheibenberg, collected with great diligence every information in regard to the history of the neighbouring country, and died, at a great age, in 1688. According to his account, the colour-mills, at the time when he wrote, were about a hundred years old; and as he began first to write towards the end of the thirty years' war, the invention seems to fall about 1540 or 1560. He relates the circumstance as follows: "Christopher Schurer, a glass-maker at Platten, a place which belongs still to Bohemia, retired to Neudeck, where he established his business. Being once at Schneeberg, he collected some of the beautiful coloured pieces of cobalt which were found there, tried them in his furnace; and finding that they melted, he mixed some cobalt with the vitreous mass, and obtained fine blue glass. At first he prepared it only for the use of the potters; but in

---

as the name of a spirit or phantom. See *Menage, Diction. etymol.* i. 681.

* Sammlung zur Sächsischen geschichte, iv. p. 363.

the course of time it was carried as an article of merchandise to Nuremberg, and thence to Holland. As painting on glass was then much cultivated in the latter, the artists there knew better how to appreciate this invention.* Some Dutchmen therefore repaired to Neudeck, in order that they might learn the process used in preparing this new paint. By great promises they persuaded the inventor to remove to Magdeburg, where he also made glass from the cobalt of Schneeberg; but he again returned to his former residence, where he constructed a handmill to grind his glass, and afterwards erected one driven by water. At that period the colour was worth seven dollars and a half per cwt. and in Holland from fifty to sixty florins. Eight colour-mills of the same kind, for which roasted cobalt was procured in casks from Schneeberg, were soon constructed in Holland; and it appears that the Dutch must have been much better acquainted with the art of preparing, and particularly with that of grinding it, than the Saxons; for the elector John George sent for two colour-makers from Holland, and gave a thousand florins towards enabling them to improve the art. He was induced to make this advance chiefly by a remark of the people of Schneeberg, that the part of the cobalt which dropped down while it was roasting contained more colour than the roasted cobalt itself. In a little time other colour-mills were erected around Schneeberg. Hans Burghard, a merchant and chamberlain of Schneeberg, built one by which the eleven mills at Platten were much injured. Paul Nordhoff, a Frieslander, a man of great ingenuity, who lived at the Zwitter-mill, made a great many experiments in order to improve the colour, by which he was reduced to so much poverty that he was at length forced to abandon that place, where he had been employed for ten years in the colour-manufactory. He retired to Annaberg, established there in 1649, by the assistance of a merchant at Leipsic, a colour-manufactory, of which he was appointed the director; and by these means rendered the Annaberg cobalt of utility. The consumption of this article however must have decreased in the course of time; for in the year 1659, when there were mills of the same kind at more of the towns in the neighbourhood of mines, he had on hand above 8000 quintals." Thus far Lehmann.

---

* Guicciardini in his *Descriptio Belgii*, i. p. 4, says: Vitro quo pacto colores imprimantur et incoquantur Belgarum inventum est. Albinus in *Meisnischer bergchronik*, p. 159, speaks of the paint for enamel made at Antwerp.

This information is in some measure confirmed by Melzer,* who says, that the mines of Schneeberg, which were first discovered in the middle of the fifteenth century, had declined so much towards the middle of the sixteenth, that it was impossible to get any profit by them till the year 1550, when a greater advantage arose from the new method of using cobalt. About this period a contract was entered into with the Dutch, who agreed to take the roasted cobalt at a certain price. Lehmann* says, but without adducing any proofs, that a manufactory for making blue glass was erected by Sebastian Preussler, between Platten and Eybenstock, so early as 1571. Rossler,† who died in 1673, in the seventy-sixth year of his age, gives us to understand that a century and a half before his time, cobalt was procured and sold as zaffer; but that the colour-mills in the country had been established only about sixty years. I conjecture therefore, that the roasted cobalt, to which sand was added, in order that the nature of it might be better concealed, and the further preparation of it rendered more difficult, was given up to the Dutch, even so early as the beginning of the sixteenth century,‡ and that these people by

---

* Christian Melzers Berglauftige beschreibung der stadt Schneeberg. Schneeberg 1684, 4to. p. 405. The same account is given in his *Historia Schneebergensis*, that is, *Erneuerte stadt- und bergchronika der stadt Schneeberg*. Schneeberg 1716, 4to. In these works one may see the dispositions made from time to time by the

---

electors of Saxony, to support this highly profitable employment and trade. The latest information on this subject is to be found in *Von Hoffmanns Abhandlung über die eisenhütten*, Hof. 1785, 4to.

* Cadmiologia, i. p. 14.

† Speculum metallurgiæ politissimum. Dresden 1700, fol. p. 165.

‡ I say, in the beginning of the sixteenth century, on the authority of the following information in *Melzers Berglauftige beschrei-*

melting it anew, or at any rate by pounding it finer, derived the greatest benefit from it long before the Saxons themselves constructed mills according to the model of those used in Holland. At present many Dutchmen grind German cobalt with very great advantage.*

It appears that this new paint was not made known in books till a late period. Agricola was not acquainted with the blue glass, nor is zaffera mentioned either by him or Mathesius. Albin also, who indeed derived the greater part of his information from these two writers, says not a word respecting it; but he tells us that bismuth when put in vessels grew together again.† He seems therefore to allude to cobalt roasted and mixed

---

bung Schneebergs, p. 469, which seems not to have been noticed by others. "Peter Weidenhammer, a Franconian, came hither poor; but by means of a colour he procured from pounded bismuth, and of which he exported many quintals to Venice, at the rate of twenty-five dollars per quintal, he soon acquired great riches, and built a beautiful house in the market-place. His name is inscribed in the lower window of the chancel of the great church, with the date 1520." At that period a great deal of this paint was prepared at Venice, and it may therefore be easily comprehended how Vannuccio could be so early acquainted with zaffera.

* How early manufactories for blue paint were erected beyond the boundaries of Saxony and Bohemia I do not know, as I have found no information on that subject. We are however told by Calvor, in *Beschreibung des maschinenwesens am Oberharze*, ii. p. 202, that a person was engaged to superintend the blue-paint-manufactory at St. Andreasberg in the year 1698.

† Meisnische bergchronik, p. 133. tit. 16.

with sand, which when packed up becomes a solid body, whereas bismuth which has been purified by roasting can never assume that state. Vanuccio Biringoccio,[*] the oldest writer in whose works I have as yet observed the name *zaffera*, describes its use for painting glass, and calls it a heavy mineral, without defining it any further. Cardan[†] gives the name of zaffera to an earth which colours glass blue. Cæsalpin says it is a stone;[‡] and Julius Scaliger must have known as little of it, else he would have mentioned it in his Exercitations on Cardan. Porta, who employed great diligence to acquire knowledge of this kind, often mentions *zaphara figlinorum*, without telling us what it is; but he describes how it must be melted, poured into water, pounded, sifted, and reduced into a fine powder in order to be employed for making artificial precious stones.[§] Neri, who wrote about the year 1609,[‖] knew nothing more of it; and Merret, who lived in the middle of the sixteenth century, confesses that he knew not what *zaffera* was, but he believed that it was a new German invention, at least that it was brought from Germany, and that it seemed to him to be made from copper and sand, with the addition perhaps of calamine.[*] The first person who properly explained *zaffera* in his writings, and gave a correct account of the method of preparing it, is, in my opinion, Kunkel[†] in his annotations on Neri and Merret. That writer says, zaffera was by the miners called *zafloer*, and that sand was mixed with it only that the powder-blue used by women for linen, and by painters called blue smalt, might not be imitated in other countries.

---

[*] La zaffera é un' altro mezzo minerale ponderoso, come metallo, che per se solo non fonde, et in compagnia di cose vetrificate fa come aqua, et tegne in azurro tal che chi vuol tegner vetri, o dipinger vasi di terra vitriati di color azurro adopera questa, et a voglia dell' artifice serve nelle sopradette operationi, ancor per negro, caricandole di piu quantità di questa, che per azurro non comporta.

[†] Lib. v. De subtil.

[‡] Lib. ii. cap. 55.

[§] Magiæ naturalis lib. vi. 4to. Francofurti 1595, 8vo. p. 271.

[‖] De arte vitriaria, cum Christ. Meretti observat. Amstelod. 1668, 12mo. lib. i. cap. 12. p. 32.

Rosler says, the Bohemian cobalt is not so good as that of Misnia, and that its colour is more like that of ashes. That Brandt, a member of the Council of Mines in Sweden, first asserted, that cobalt contained a peculiar kind of semimetal, must be so well known to mineralogists, that it scarcely deserves to be mentioned.[‡]

---

[*] De Arte vitriar. p. 327.

[†] Glasmacherkunst. Nurnberg 1743, 4to. p. 46.

[‡] Act. litter. et scient. Upsal 1733. Wallerii Systema miner. ii. p. 164.

TURKEYS.

THAT these fowls, which at present are every where common, were brought to us from a different part of the world, is, I believe, generally admitted; but respecting their original country, and the time when they were first introduced into Europe, there is much difference of opinion among those who in latter times have made researches on that subject.* I shall therefore compare what has been advanced on both sides with what I have remarked myself, and submit my decision to the judgment of the reader.

The question, whether turkeys or Turkey-fowls were known to the Greeks and the Romans, will depend upon defining what those fowls were to which they gave the name of *meleagrides* and *gallinæ Africanæ*; for in the whole ornithology of the ancients, there are no other kind that can occasion doubt. It has however been justly remarked by Perrault and others, that every thing which we find related by the ancients of the *meleagrides* can be applied only to the pintado or Guinea fowl (*Numida meleagris* Linn.), and not to the turkey; and that the *gallinæ Africanæ* were only a variety of the former, or a species that approached nearly to them. Their spots disposed in such a manner as if formed by drops, on account of which, in modern times, they have been called *pintados* and *pientades*, and the marks on the feathers of the wings accord perfectly with the description given of them by Clytus, the scholar of Aristotle;* though in northern countries, some Guinea fowls are found, the colour of which is more mixed with white. But this is a variation not uncommon among birds in general when removed from their native country, as is proved by the white peacocks, which were first observed in Norway. The coloured hood of thick skin which covers the head, has also been accurately described by Clytus, as well as the coloured fleshy excrescence on the bill (*palearia carunculacea*). In size the *meleagrides* were like our largest common fowls, which is true also of the pintado; and we must acknowledge with Clytus, that its naked head is too small in proportion to the body. The figure of the pintado, like that of the partridge, and its drooping tail, correspond equally well with the epithet *gibberæ*, especially as the position of its feathers occasions its back to appear elevated or bent upwards. The feet are like those of the domestic fowl, but they are destitute of the spurs with which those of the latter are furnished; and the pintado lays spotted eggs, as described by Aristotle; but these, by the manner in which the fowls are reared in Europe, are liable to variations. It deserves to be remarked above all, that both sexes of the *meleagrides* are so like, that they can scarcely be distinguished; and this circumstance alone is sufficient to confute those who pretend that the *meleagrides* were our turkeys. Had that been the case, it is impossible that Clytus in his description, which seems to have been drawn up with great care, should have omitted the proud and ridiculous gestures of the turkey-cock when he struts about with his tail spread out like a fan, or thrown into a circular form, and his wings trailing on the ground, or the long excrescence that hangs down from his bill, and the tuft of black hair on his breast. The unpleasant cry, and the unsocial disposition of the meleagrides, are observed in the

---

* The principal works in which information may be found on this subject, are Perrault in *Mémoires pour servir à l'histoire naturelle des animaux,* which forms the third part of *Mémoires de l'Academie Royale des Sciences depuis* 1666 *jusqu' à* 1699. *Traité de la police, par De la Mare,* ii. p. 726. *Buffon, Naturgeschichte der vögel,* edition of Berlin, iv. p. 213 and 239. *Pallas, Spicilegia Zoologica,* fascic. iv. p. 10. Pennant, in the Philosophical Transactions, vol. lxxi. part i. p. 72. Pennant's Arctic Zoology, vol. ii. Birds, p. 294. Miscellanies by Daines Barrington. London 1781, 4to. p. 127.

---

* Athenæus, Deip. lib. xiv. p. 655. Most of those passages of the ancients in which this fowl is mentioned have been collected by Conrade Gesner, in his *Histor. avium*, p. 461, and by Aldrovandus in his *Ornithologia*, lib. xiii. p. 18. When we consider the feathers as delineated by Perrault, we shall find the comparison of Clytus more intelligible than it has appeared to many commentators.

Guinea fowls, which, as the ancients justly remarked, frequent rivers and marshes, where turkeys on the other hand never thrive.

The ancients assure us, that the native country of the *meleagrides* was Africa,* where the Guinea fowls are still found in a wild state, but where our turkeys were never seen wild. When writers however mention places not in Africa, to which the former were brought, we are not to suppose that they were carried thither directly from Africa. The difference which Columella and Pliny † make between the *meleagrides* and *gallinæ Africanæ* is so trifling, as to imply only a variety of the species; and the opinion of professor Pallas, who has occasionally collected a number of important observations which may serve to explain the natural history of the ancients, is highly probable, that we are to understand under it the *Numida mitrata*, which he has described. The red crest which the last-mentioned bird always has, and which almost alone distinguishes it from the common Guinea fowl, seems fully to prove this opinion.* I shall here take occasion to remark, that Buffon erroneously affirms, that the Guinea fowls, which were transmitted from the Greeks and the Romans, became extinct in Europe in the middle ages; for we find mention made of them in English writers, under the name of *Aves Africanæ*, *Afræ*, so early as about the year 1277.†

---

* Plin. Strabo. The following passage of the *Periplus Scylacis*, p. 122, which I have never found used in the history of the *meleagrides*, is worthy of remark. This geographer, speaking of a lake in the Carthaginian marshes, says: Circa lacum nascitur arundo, cyperus, stoebe et juncus. Ibi meleagrides aves sunt; alibi vero nusquam nisi inde exportatæ. The above passage, in my opinion, may serve to supply a deficiency in Antigonus Carystius's *Hist. mirabil.* cap. 11.

† Gallina Africana, quam plerique Numidicam dicunt, meleagridi similis, nisi quod rutilam galeam et cristam capite gerit, quæ utraque sunt in meleagride cœrulea. *Columella*, viii. 2, 2, p. 634.

That the ancients were not acquainted with our turkeys is still further confirmed by the testimony of various historians and travellers, who assure us in the first place, that these birds are still wild in America; secondly, that they were brought to us from that country; and thirdly, that before the discovery of the New World they were not known in Europe. Besides, we are enabled from the information which they give us, to see how and when these animals were conveyed to those countries where they at present are reared as domestic fowls; and these proofs appear to me so strong, that I conclude Barrington asserted the contrary, that he might obtain assent not so much by the force of truth as by advancing absurdities. All animals multiply more easily, and become larger, stronger, and more fruitful in those places which nature has assigned to them for a residence, that is, where they originally lived wild; and this observation seems to hold good in regard to the turkeys in America. It is indeed probable, that the number of wild animals will always decrease in proportion as countries are peopled, and as woods are cut down, and deserts cultivated; it is probable also, that at last no wild animals will be left, as has been the case with sheep, oxen, and horses, which have all long ago been brought into a state of slavery by man.* The testimony therefore of those who first visited America, and who found there wild turkeys, deserves the greater attention.

---

* I have here quoted nothing more than what I thought requisite to prove that the *meleagrides* of the ancients were our Guinea fowls, because I had no intention of treating fully on a subject which has been handled by so many others; and because I had only to show that they were not turkeys. Had not this been the case, it would have been necessary for me to collect into one point of view every thing that the ancients have said of these fowls, with the words used by the different writers. It may however be said, that by this mode of examining a disputed point, a mode indeed practised by many, the reader may be led to an ill-founded approbation, because what is not agreeable to the author's assertion may be easily concealed. But this observation is not applicable to me; for I confess, that I do not know with certainty whether the Guinea fowls are as careless of their young as the *meleagrides* are said to have been; whether their cry, which I have often enough heard, and which is indeed unpleasant, agrees with the κακκαζειν of *Pollux*, v. § 90; and whether the αλεκτρυονες μεγεθει μεγιστοι, mentioned in Ælian's *Hist. animal.* xvi. 2. belong to the Guinea fowls, or, as Pennant will have it, to the *Pavones bicalcarati*.

† Kennet's Parochial antiquities, p. 287. The meleagrides also, which Volateran saw at Rome in 1510, were of the same kind. The whole passage however does not deserve that attention which De la Mare has paid to it. *Commentarii urbani* lib. xxv. p. 949.

---

* This observation is made by Varro in *De re rustica*, ii. 1. p. 238.

The first author in whom I find mention of them is Oviedo, who wrote about the year 1525.* He has described them minutely with that curiosity and attention which new objects generally excite; and as he was acquainted with no name for these animals, till then unknown to the Europeans, he gave them that which he thought best suited to their figure and shape. He calls them a kind of peacocks, and he relates that even then, on account of their utility, and the excellent taste of their flesh, they were not only reared and domesticated by the Europeans in New Spain, where they were first found, but that they were carried also to New Castille, and to the West-India islands. The other fowls likewise which he describes we have without doubt procured from America, such for example as the *crax alector*.[*] Lopez de Gomara, whose book was printed in 1553, makes use of the name *gallopavo*; and says that the animal resembles in shape the peacock and the domestic cock; and that of all the fowls in New Spain its flesh is the most delicious.[†] In the year 1584 wild turkeys were found in Virginia.[‡] René de Laudonniere found them on his landing in North America in 1564.[§] Fernandez also reckons them among the birds of Mexico; and takes notice of the difference between those that were wild and those which had been tamed.[||] Pedro de Ciesa

---

* I shall here give the passage in Italian from the third volume of the Collection of Voyages by Ramusio. *Sommario dell' Ind. Occid. del Sig. Gonzalo di Oviedo,* cap. 37: Altri pavoni, maggiori, e migliori da mangiare, e più belli, si son trovati nella provincia detta là Nuova Spagna, de' quali molti sono stati portati nell' isole, e nella provincia di Castiglia dell' Oro, e si allevano domestici in casa de Christiani. Di questi le femine sono butte, e i maschi belli, e molto spesso fanno la ruota, benchè non abbiano cosi gran coda, nè tanto bella, come quei di Spagna, ma in tutto il resto della piuma sono bellissimi. Hanno il collo e la testa coperta di una carnosità senza piuma, la quale mutano di diversi colori quando gli vien sa fantasia, e specialmente quando fanno la ruota, la fanno diventare molto rossa, e come la lasciano giu, la tornano gialla, e di altri colori, e poi come nero verso il berrettino, e alcune volte bianca. Ha nella fronte sopra il becco a modo di un picciolo corno di una poppa, il quale, quando fa la ruota, slarga, e cresce più di un palma. A mezzo il petto gli nasce un fiocco di peli, grosso come un dito, li quali peli sono nè più, nè manco che quelli della coda di un cavallo, di color neri, e lunghi più di un palma. La carne di questi pavoni è molto buona, e senza comparazione migliore e più tenera, che quella de' pavoni di Spagna.—It is impossible that Oviedo should have written in this manner, had these fowls been so well known in Europe as Barrington thinks they were.

---

[*] The peacock pheasant of Guiana. *Bancroft*. Quirissai or Curassao. *Brown*. The crested curassow. *Latham*. TRANS.

[†] La mejor ave para carne, que ay en la Nueva España son los Gallipavos. Quise los llamar assi por quanto tienen mucho de pavon, y mucho de gallo. Tiene grandas barvas, o paperas, que se muda de muchas colores. *Hist. de Mexico*, p. 343.

[‡] Hakluyt, vol. iii. p. 274.

[§] Pennant quotes also De Bry, but that author I never consulted.

[||] Huexolot gallus est Indicus, quem gallipavonem quidam vocant, noruntque omnes. Reperiuntur alii sylvestres, duplo domesticis majores; duriore et insuaviori alimonia cætera similes, qui interdum sagittis, interdum vero tormentorum bellicorum vi solent interimi. Sunt et feminæ in supradicto genere cihuatotolin vocatæ, quæ maribus sunt viliores, etsi gratissimo atque salubri alimento, cedente tamen ei, quod sumitur a nostratibus, ob humiditatem et

saw them on the isthmus of Darien,* and Dampier in Yucatan.† Besides the testimony of many other later travellers which have been already quoted by Buffon, and which I shall not here repeat, the accounts of Kalm and Smyth in particular deserve to be noticed. The former, who visited Pennsylvania in 1784, says, "The wild turkeys "run about here in the woods. Their wildness "excepted, they are in nothing different from ours, "but in being generally a little larger, and in having redder flesh, which is, however, superior in "taste. When any one finds their eggs in the

---

pinguedinem quandam nimiam, et nauseam moventem aliquibus delicatioris palati. *Historia animalium Novæ Hispaniæ*, which forms an appendix to his *Thesaur. Rerum medicar. Novæ Hispaniæ.* Barrington remarks that Fernandez would not have said *quem norunt omnes*, had these animals been first made known from America: for Mexico was discovered in 1519, and Fernandez appears to have written about 1576. This reason, however, appears to me of little weight; especially as it is certain that these fowls, like many other productions which excited universal curiosity, were soon every where common Besides, it is not certain that these words were really written by Fernandez.

[*] An English translation of Ciesa's Voyage may be found in Stevens's New Collection of voyages and travels.

[†] Vol. ii. part ii. p. 65, 85, 114. Leri seems also to have found them in Brasil, for Laet, in his *Novus orbis*, Lugd. Bat. 1633, fol. p. 557, speaking of Brasil, says: Lerius scribit, duo genera exquisitarum avium hic reperiri, quibus nomen est mouton, pavonum magnitudine, pluma nigra et leucopeata; itemque maximam gallinarum, quas vocant Indicas, multitudinem, quas Barbari vocant arignaousau, sicuti nostrates vocant arignaumiri.—As the description, however, is not clear, and as the diligent Marggraf does not mention it among the animals of Brasil, this information appears to be very uncertain.

" woods, and places them under a tame hen to be " hatched, the young, for the most part, become " tame also; but when they grow up they make " their escape. On this account people cut their " wings before they are a year old. These wild " turkeys, when tamed, are much more mischiev- " ous than those tame by nature."[*] Smyth assures us that wild turkeys are so abundant in the uncultivated country behind Virginia, and the southern provinces, that they may be found in flocks of more than five thousand.[†]

These testimonies, in my opinion, are sufficiently strong and numerous to convince any naturalist that America is the native country of these fowls; but their weight will be still increased if we add the accounts given us when and how they were gradually dispersed throughout other countries. Had they been brought from Asia or Africa some centuries ago, they must have been long common in Italy, and would have been carried thence over all Europe. We, however, do not find that they were known in that country before the discovery of America. It is certain that there were none of them there at the time when Peter de Crescentio wrote; that is to say, in the thirteenth century;[‡]

---

[*] Kalms Reise, ii. p. 352.

[†] A Tour in the United States of America, by J. F. D. Smyth. London 1784, 2 vol. 8vo.

[‡] Crescentio lived about the year 1280. Italian and German manuscripts of his book, which I have often quoted, may be found

else he would not have omitted to mention them where he describes the method of rearing all domestic fowls, and even peacocks and partridges. The earliest account of them in Italy is contained in an ordinance issued by the magistrates of Venice, in 1557, for repressing luxury, and in which those tables at which they were allowed are particularised.* About the year 1570 Bartolomeo Scappi, cook to pope Pius V, gave in his book on cookery several receipts for dressing these expensive and much esteemed fowls.† That they were scarce at this period appears from its being remarked that the first turkeys brought to Bologna were some that had been given as a present to the family of Buonocompagni, from which Gregory

---

in old libraries. In that of the cathedral at Mentz there is a German one of the year 1464; and a Latin one, in folio, of 1469.

* This ordinance may be found in *Lettere di Antonio Zanon*; in Venezia 1763, 8vo. tom. i. p. 34. E parimenti non si possono in detti conviti metter in tavola pernici e galli, che chiamiamo d'India.

† Opera di M. Bartolomeo Scappi, cuoco secreto di Papa Pio V. in Venetia 1570, 4to. lib. v. cap. 36, p. 346: Per fare pastici di pavoni nostrali, galli d'India et altri volatici. Cap. 37: Per fare pasticcio di pollancha, d'India.—The copy in the library of our university contains eighteen copper-plates, which represent different kitchen utensils, and various operations of cookery. Among the former is a smoke-jack: *molinella a fumo*. These plates are well coloured, and the gilding, above all, is neatly executed. I am inclined to think that turkeys, at this period, were very little reared by farmers; for I do not find any mention of them in *Trattato dell' agricoltura, di M. Affrico Clemente, Padovano,* in Venetia 1572. 12mo; though the author treats of all other domestic birds.

XII, who at that time filled the papal chair, was descended.*

That these fowls were not known in England in the beginning of the sixteenth century, is very probable; as they are not mentioned in the particular description of a grand entertainment given by archbishop Nevil;† nor in the regulations made by Henry VIII respecting his household, in which all fowls used in the royal kitchen are named.‡ They were, however, introduced into that country about the above period; some say in the year 1524; others, in 1530; and some, in 1532.§ We know, at any rate, that young turkeys were served up at a great banquet in 1555;‖ and about 1585 they were commonly reckoned among the number of delicate dishes.¶

---

* This is related by Zanon; but he does not give his authority.

† It is certain that the name does not occur in the List of archbishop Nevil's feast, nor is it mentioned in the Earl of Northumberland's Household-book, so late as the year 1512. *Latham's General synopsis of birds,* vol. ii. part 2, p. 66.

‡ This order, which is worthy of notice, may be found in *Archæologia,* or *Miscellaneous tracts relating to antiquity,* vol. iii. p. 157.

§ Anderson, Geschichte des handels, iii. p. 518, and iv. p. 131, 189. *Hakluyt,* ii. p. 165, gives the year 1532; and in Barnaby Googe's Art of husbandry, the first edition, printed in 1614, as well as in several German books, the year 1530 is mentioned.

‖ Origines Juridiciales, by W. Dugdale. In the Savoy 1671. fol. p. 135.

¶ Pennant quotes the following rhyme from *Tusser's Five hundred points of husbandry:*

Beefe, mutton and porke, shred pies of the best,
Pig, veale, goose and capon and turkie well drest;

According to the account of some writers, turkeys must have been known much earlier in France: but on strict examination no proofs of this can be found. The earliest period assigned for their introduction into that country is given by Beguillet,* who confidently asserts that they were brought to Dijon under the reign of Philip the Bold, about the year 1385. Had this French author quoted his authority, we might have discovered what gave rise to his mistake; but as he has not, one cannot help suspecting that the whole account is a fiction of his own. De la Mare also is in an error when he relates that the first turkeys in France were those which Jaques Cœur, the well-

---

Cheese, apples and nuts, jolie carols to heare,
As then in the countrie, is counted good cheare.

These lines he places in the year 1585, in which the book was printed for the second time; but as there was an edition in 1557, which is mentioned in Haller's *Biblioth. botan.* i. p. 319, a question arises whether they are to be found there also. In the new edition of 1744, 8vo. which I have now before me, they are entirely omitted.

* Description du duché de Bourgogne, par M M. Courtépée et Beguillet, Dijon 1775, 8vo. vol. i. p. 193, and in *Description générale et particuliere de la France.* Paris 1781, fol. In the *Description of Burgundy*, p. 196, the following passage occurs:—C'est sous le regne de Philippe le Hardi, que les gelines d'Inde furent apportées d'Artois à Dijon en 1385; ce qui montre la fausseté de la tradition, qui en attribue l'apport à l'Amiral Chabot au seizième siècle. Cent ans avant Chabot, Jaques Cœur en avoit transporté de Turquie en son chateau de Beaumont en Gatinois, et Americ Vespuce en Portugal.—What impudence to make such an assertion without any proof!

known treasurer to Charles VII, brought with him from the Levant, and kept on his estate in Gatinois, after he had received the king's permission to return to the kingdom. This Cœur, however, who was banished in 1450, never returned, but died in the island of Chio in the year 1456.* Equally false is the account given by Bouche in his History of Provence, that René, or Renatus, king of Naples and duke of Anjou, first brought turkeys into the kingdom, and reared them in abundance at Rosset.† This author gives as his authority the oral tradition of the neighbourhood, which certainly cannot be put in competition with testimony of a more authentic nature. Another Bouche,‡ who a few years ago wrote also a History of Provence, and who has collected many things that do honour to Renatus, makes no mention of this service, though he could not be ignorant of what had been before related by his namesake. Had these fowls been known so early as the time of that monarch, who died in 1480, it is impossible that they could have been so scarce in France as they really were above a hundred years after. The assertion, often repeated, but never indeed proved, that they were first brought to France by Philip de Chabot, admiral under Francis I, is much more probable. Chabot died in 1543; and what Scaliger says, that in 1540 some turkeys were still remaining in France, may be considered as alluding to the above circumstance. This much however is certain, that Gyllius, who died in 1555, gave soon after the first scientific description of them, which has been inserted both by Gesner and Aldrovandus in their works on ornithology. The same year the first figure of them was published by Bellon. About the same time they were described also by La Bruyere-Champier, who expressly remarks that they had a few years before been brought to France from the Indian islands discovered by the Portuguese and the Spaniards.* How then could Barrington assert that this Frenchman meant the East and not the West Indies! They must, however, have been a long time scarce in France; for, in the year 1566, when Charles IX passed through Amiens, the magistrates of that place did not disdain to send him, among other presents, twelve turkeys.* This information seems to agree with the account often quoted, that the first turkeys were served up, as a great rarity, at the wedding dinner of that monarch in the year 1570;† but it seems the breed of these fowls was not very common under Charles IX; for they are not named in the ordinances of 1563 and 1567, in which all other fowls are mentioned.‡ In the year 1603, Henry IV caused higglers to be punished who carried away turkeys from the country villages without paying for them, under a pretence that they were for the use of the

---

* See the works which give a particular account of this James Cœur, and which have been quoted by Mr. Meusel in *Algemeine Welt historie*, xxxvii p. 615.

† Il se plaisoit aussi fort à l'agriculture, comme à l'occupation la plus innocente. Il fut le premier, à ce qu'on écrit, qui introduisit en France les oeillets de Provence, les roses de Provins, et des musquées, des paons blancs, des perdrix rouges, des connils blancs, noirs et rouges, et y rendit aussi fort familiers les cocqs d'Inde, dont il faisoit grand amas en Provence, et les faisoit nourrir au lieu de la galiniere près de Rosset, et selon la tradition du voisinage. *La Chorographie ou Description de Provence, et l' Histoire chronologique du mesme pays*, par Honoré Bouche. A Aix 1664, 2 vol. fol. ii. p. 479.

‡ Essai sur l'histoire de Provence. A Marseille 1785, 2 vol. 4to.

---

* Venerunt in Gallias annos abhinc paucos aves quædam externæ, quas gallinas Indicas appellant; credo, quoniam ex Insulis Indiæ nuper a Lusitanis Hispanisque patefactæ primum invectæ fuerunt in orbem nostrum, quæ pavones fere magnitudine æquant; feminæ pennas non habent variegatas, pariunt ova anserinis amplitudine paria, candida, quæ esui sunt. Mares variis coloribus distinguuntur, feminis ampliores, qui cristas erectas, ut gallinacei nostri, minime gerunt, sed carnosum quidpiam rubrum, quod etiam sub mento instar

---

paleariorum dependet, longitudine insigni, in quo, illis excandescentibus et turbatis, miros variosque colores est spectare. Vix tamen cœlum nostrum patiuntur et difficillime educantur. Voraciores sunt, ideoque copioso indigent cibario. Segnitiem domini non ferunt, sed maxime infantes pulli, qui haud temere perveniunt ad adolescentiam, nisi sedula et assidua impendatur opera. Omnino alites sunt. *De re cibaria*, lib. xv. cap. 73, p. 632. This work was first published by the author in 1560, but it was written thirty years before. Turkeys, therefore, at any rate, must have been in France in 1630.

* Histoire de la vie privée des Français, par Le Grand d'Aussy, i. p. 292.

† Andersons Geschichte des handels, iv. p. 131. Keyslers Reisen, ii. p. 413.

‡ De la Mare.

queen.* I shall here also remark, that I can no where find that the Jesuits are entitled to the merit of having introduced these fowls into France.†

As these American fowls must have been carried to Germany through other lands, we cannot expect to find them in that country at an earlier period. Gesner, who published his Ornithology in 1555, seems not even to have seen them.‡ We are, however, assured by several authors, such as B. Heresbach,§ Colerus‖ and others, that turkeys were brought to Germany so early as 1530; and in the same year carried to Bohemia and Silesia.¶

---

* This is related by Le Grand, from the Journal of L'Etoile.

† On lit, dans l'Année litteraire, que Boileau, encore enfant, jouant dans une cour, tomba. Dans sa chute, sa jaquette se retrousse; un dindon lui donne plusieurs coups de bec sur une partie très-délicate. Boileau en fut toute sa vie incommodé; et de-là, peut-être, cette sévérité de mœurs, - - - - sa satyre contre les femmes. - - - Peut-être son antipathie contre les dindons occasionna-t-elle l'aversion secrette qu'il eut toujours pour les Jesuites, qui les ont apportés en France. *De l'Esprit* (*par Helvetius*). Amsterdam 1759, 12mo. i. p. 288.

‡ I conclude so from the following passage, p. 465: Gallopavum *aiunt* vocem quandam edere gallinaceæ non dissimilem nescio quid crocitando; et in frigidis ægre ali. Minimum ex eis fructum esse, sumptus in educando alendoque, et curæ multum requiri. In cibo lautissimos haberi, et principum mensis dignos.

§ Indicarum, ut vocant, avium recens apud nos usus et educatio. Nam ante annum tricesimum supra sesquimillesimum apud nos non sunt visæ, neque veteribus arbitror notas. *De re rustica.* Spiræ Nemet. 1595, 8vo. lib. iv. p. 640.

‖ Hausbuch, vierter theil. Wittenberg, 1611. 4to. p. 499.

¶ Oekonomische nachrichten der Schlesischen geselschaft, 1773.

Respecting the northern countries, I know only, on the authority of Pontoppidan, that they had been in Denmark two hundred years before his time.*

As these fowls are found at present both in Asia and Africa, it may be worth while to inquire at what period they were carried thither, especially as these quarters of the world have been by some considered as their native countries. In China there are no other turkeys than those which have been introduced from other parts, as we are expressly assured by Du Halde, though he erroneously adds that they were quite common in the East Indies.† They were carried to Persia by the Armenians and other trading people, and to Batavia by the Dutch.‡ In the time of Chardin they were so scarce in Persia that they were kept in the Emperor's menagerie.§ In the kingdom of

---

p. 306. *Schwenkfeld, Teriotroph. Silesiæ.* For the festival of the university of Wittenberg, in 1602, fifteen Indian or Turkey fowls were purchased at the rate of a florin each. They were in part dressed with lemon-sauce. See *Wittenbergisches Wochenblatt*, 1788. p. 258, 267.

* Naturhistor. von Dannemark. Kopenhag. 1765, 4to. p. 172.

† Hist. génér. des voyages, vi. p. 487.

‡ Bell's Travels, i. p. 128.

§ "Turkeys (*poulets d'Inde*) are there foreign and scarce birds. The Armenians, about thirty years ago, carried from Constantinople to Ispahan a great number of them, which they presented to the king as a rarity; but it is said that the Persians, not knowing the method of breeding them, gave in return the care of them to these people, and assigned a different house for each. The Armenians, however, finding them troublesome and expensive, suffered them

Congo, on the Gold Coast, and at Senegal, there are none but those belonging to the European factories. According to Father de Bourzes there are none of them in the kingdom of Madura; and we are told by Dampier that this is the case in the island of Mindanao. Prosper Alpinus also gives the same account in regard to Nubia and Egypt; and Gemelli Carreri says there is none of them in the Philippines; though I agree with Buffon in laying very little stress upon the Travels known under that name, which we have reason to suppose not genuine.*

It is worthy of remark, that Cavendish found a great number of turkeys in the island of St. Helena so early as the year 1588; and Barrington misapplies this circumstance to prove that these fowls did not come from America. It is, however, very doubtful whether Cavendish really meant our turkeys, as he says, *Guiney cocks, which we call turkeys*;† for the first name belongs to what are at

---

almost all to perish. I saw some which were reared in the territory of Ispahan, four leagues from the city, by the Armenian peasants; but they were not numerous. Some imagine that these birds were brought from the East-Indies; but this is so far from being the case, that there are none of them in that part of the world. They must have come from the West Indies, although they are called *cocqs d'Inde*, because, being larger than common fowls, they in that resemble the Indian fowls, which are of much greater size than the common fowls of other countries." *Voyages de Chardin*, iv. p. 84.

* The proofs may be seen in Buffon.

† Hakluyt, ii. p. 825.

present called pintados; and it is therefore uncertain which kind ought here to be understood. But even allowing that they were turkeys, is it improbable that they should be on an island which had often been visited by the Portuguese? The account of De la Croix is of as little weight; for he says that in the woods of Madagascar there are many *coqs d'Inde*.* De la Croix published his book in 1688, at which time there were in South America wild horses and wild cattle. Does this, therefore, invalidate the certainty of these animals being carried thither from Europe?

I intended to enter into a critical examination of those grounds upon which Barrington endeavours to prove that turkeys were originally brought from Africa; but on reading over his essay once more, I find the greater part of his arguments are sufficiently refuted by what I have proved from the most authentic testimony; and nothing now remains but to add a few observations. Barrington considers it improbable that these fowls should be so soon spread all over Europe, as Cortez first visited Mexico in 1519, subdued the capital in 1521, and returned to Spain in 1527. To me, however, it does not appear incredible; for I could prove by several instances, that the curiosity excited by the most remarkable American productions soon became general. Those, for example, who take the trouble to inquire into the history of maize or Turkish corn will make the same remark; though it is a truth fully established that we procured that grain from America. How soon did tobacco become common! In the year 1599 the seeds were brought to Portugal; and in the beginning of the seventeenth century it began to be cultivated in the East Indies. When Barrington asserts that these fowls were carried to America by the Europeans, in the same manner as horses and cattle, this argument may be turned against himself; for he must doubtless find it equally improbable that they should so soon become common, numerous, and wild, in the New World, as they must have been according to the authorities above quoted.

---

* Relation universelle d'Afrique. Lyon 1688, iv. p. 426.

As many fat turkeys were purchased yearly in Languedoc and sent to Spain in the time of cardinal Perron,* it is thence concluded that these fowls were not first brought to France through the latter. Perron died in 1620. At that period turkeys were very common; and whoever is acquainted with the industry of the Spaniards will not find it strange that the French should begin earlier to make the rearing of these animals an employment. How falsely should we reason, were we to say that it is impossible the English and French should procure the best wool from

---

* Le coq d'Inde est un oiseau qui a peuplé merveilleusement; de Languedoc ils en mênent en Espagne, comme de moutons. *Perroniana*, p. 67.

Spain, because the Spaniards purchase the best cloth from the French and the English!

One proof by which Barrington endeavours to show that turkeys were esteemed so early as the fifteenth century is very singular. He quotes from Leland's Itinerary that *capons of Grease* were served up at an entertainment, under Edward IV, in 1467. The passage alluded to I cannot find; but an author must be very self-sufficient and bold indeed, to convert *capons of Grease* into *capons of Greece*, and to pretend that these were turkeys.*

What, however, most excites my surprise is, that the name of these fowls even should be assumed by this writer as a ground for his assertion. Had they, says he, been brought from America, they would have been called American or West-Indian fowls; as if new objects had names given to them always with reflection. Names are often bestowed upon objects before it is known what they are or whence they are procured. Ray, Minshew,† and others have been induced by the name turkey-fowls to consider Turkey as their original country; but whoever is versed in researches of this kind must know that new foreign articles are often called Turkish, Italian, or Spanish. Is Turkey the original country of maize? or is Italy the original country of these birds, because they have been sometimes called Italian fowls? Even allowing that turkeys had acquired their German name (*kalekuter*) from Calicut, this, at any rate, would prove nothing further than that it was once falsely believed that these animals were brought from Calicut to Europe: but I suspect that the appellation *kalekuter*, as well as the names *truthenne*, *putjen*, and *puten*, were formed from their cry. Chardin offers a conjecture which is not altogether to be neglected. That traveller thinks that these fowls were at first considered as a species of the domestic fowl, and that they were called Indian, because the largest domestic fowls are produced in that country.*

---

* The Itinerary of John Leland the antiquarian. In nine volumes. The second edition. Oxford 1744, 8vo. vol. vi. p. 5.

† Minshew's Ductor in linguas (The Guide into tongues), 1617, fol. and *Minschæi Emendatio Ductoris in linguas*, 1625, fol. p. 501, 719: Avis ita dicta, quod ex Africa, et, ut nonnulli volunt alii, ex India vel Arabia ad nos allata sit. *Calekuttisch hun*, i. e. gallina Calecuttensis.

BUTTER.

MILK, the most natural and the commonest food of man, is a mixture of three component parts, whey, butter, and cheese. The caseous part is viscous and slimy; the butter is the fat, oily, and inflammable part; and both, properly speaking, are not perfectly dissolved in the serum or whey, but rather only diffused through it like an emulsion, so that these component parts may be separated by rest alone, without any artificial preparation. When milk is in a state of rest, the oily part rises to the surface, and forms what is called cream. When the milk has curdled, which will soon be the case, the caseous parts separate themselves from the whey; and this separation may be effected also by the addition of some mixture, through means of which the produce is liable to many variations. The caseous part when squeezed and mixed with salt, and perhaps herbs, and when it has been moulded into a certain form and dried, is used under the name of cheese, which will always be better, the greater the butyraceous part is that has been left in it. The cream scummed off, and by proper agitation in a churn or other vessel separated from the whey and caseous parts, becomes our usual butter.

---

* See Chardin ut supra.

This substance, though commonly used at present in the greater part of Europe, was not known, or known very imperfectly, to the ancients.* The ancient translators of the Hebrew writers [*] seem however to have thought that they found it mentioned in Scripture: [†] but those best acquainted with biblical criticism, unanimously agree that the word *chamea* signifies milk or cream, or sour thick milk, and at any rate does not mean butter.[‡] The word plainly alludes to something liquid, as it appears that *chamea* was used for washing the feet, that it was drunk, and that it had the power of

---

* The works with which I am acquainted that treat on this subject, are the following: *Martini Schoockii Tractatus de butyro: accessit ejusdem Diatriba de aversatione casei.* Groningæ 1664, 12mo. *H. Conringii De habitus corporum Germanicorum antiqui et novi caussis.* Helmstadii 1666, 4to. and the new edition, *cum an-*

---

notationibus J. Phil. Burggravii, fil. Francofurt. ad Moenum 1727, 8vo. in which however no new observations occur respecting the subject. *Vossii Etymologicon,* art. *Butyrum. Traité de la police, par De la Mare,* lib. v. 7. ii. p. 799. *Tob. Waltheri Dissert. de butyro.* Altorfii 1743. *Conr. Gesneri Libellus de lacte et operibus lactariis, cum epistola ad Avienum de montium admiratione,* 1543, 8vo. This small treatise I have hitherto sought for in vain, and I should consider myself under very great obligations to any person who could procure it for me, or lend it to me.

[*] Bochart, Hierozoicon, ii. 45. p. 473.

[†] Genesis, chap. xviii. ver. 8: And he took butter and milk, and the calf which he had dressed, and set before them. *Deuteron.* chap. xxxii. ver. 14: Butter of kine and milk of sheep. *Judges,* chap. v. ver. 25: He asked water, and she gave him milk; she brought forth butter in a lordly dish. 2 *Samuel,* chap. xvii. ver. 29: And honey and butter and sheep. *Job,* chap. xx. ver. 17: He shall not see the rivers, the floods, the brooks of honey and butter. *Ibid.* chap. xxix. ver. 6: When I washed my steps with butter, and the rock poured me out rivers of oil. *Proverbs,* chap. xxx. ver. 33: Surely the churning of milk bringeth forth butter. *Isaiah,* chap. vii. ver. 15: Butter and honey shall he eat, that he may know to refuse the evil and choose the good. *Ibid.* ver. 22: And it shall come to pass, for the abundance of milk that they shall give, that he shall eat butter; for butter and honey shall every one eat that is left in the land.

[‡] Michaelis Supplementorum ad Lexica Hebraica, pars i. p. 807; and his *Mosaisches Recht,* § 291 and 295.

intoxicating; and we know that mares'-milk, when sour, will produce the like effect. We can imagine streams of milk, but not streams of butter. This error has been occasioned by the seventy interpreters, who translate the Hebrew word by the word *boutyron*. These translators, who lived two hundred years after Hippocrates, and who resided in Egypt, might, as Mr. Michaelis remarks, have been acquainted with butter, or have heard of it; but it is highly probable that they meant cream, and not our usual butter. Those who judge from the common translation, would naturally conclude that the passage in Proverbs, chap. xxx, describes the preparation of butter by shaking or beating; but the original words signify squeezing or pressing, *pressio, frictio mulgentis educit lac*; so that milking and not making butter is alluded to.

The oldest mention of butter, though it is indeed dubious and obscure, is in the account given of the Scythians by Herodotus.* "These people," says he, "pour the milk of their mares into wooden vessels, cause it to be violently stirred or shaken by their blind slaves, and separate the part that arises to the surface, as they consider it more valuable and more delicious than that which is collected below it." The author here certainly speaks of the richest part of the milk being separated from the rest by shaking; and it appears that we have every reason to suppose that he alludes to butter, especially as Hippocrates, who was almost cotemporary, mentions the same thing, but in a much clearer manner.* "The Scythians," says the latter, "pour the milk of their mares into wooden vessels, and shake it violently; this causes it to foam, and the fat part, which is light, rising to the surface, becomes what is called butter. The heavy and thick part, which is below, being kneaded and properly prepared, is, after it has been dried, known by the name of *hippace*. The whey or serum remains in the middle." This author, in my opinion, speaks here very distinctly of butter, cheese, and whey. It is probable that the Scythians may have hastened the separation of the caseous part from the whey by warming the milk, or by the addition of some substance proper for that purpose. These passages therefore contain the first mention of butter, which occurs several times in Hippocrates, and which he prescribes externally as a medicine;* but he gives it another term (*pikerion*), which seems to have been in use among the Greeks earlier than the former, and to have been afterwards neglected.† That this word signified butter, and was no longer employed in the time of Galen, appears from his translating it, in his explanation of the obsolete expressions of Hippocrates, by the word *boutyron*.‡ It was even before that period explained in the same manner by Erotian, in his dictionary of the words used by that Greek physician; and he remarks, from an ancient writer, that the

---

* Herodot. iv. 2. p. 281: Postquam emulxere lac, in cava vasa lignea diffundunt; et compungentes ad illa vasa cœcos lac agitant (δονεουσι το γαλα), cujus quod summum est, delibatur, pretiosiusque habetur; vilius autem quod subsidit.—That δονειν signifies to shake or beat, there can be no doubt. Theocritus uses the same word in speaking of a tree strongly agitated by the wind. It is used also to express the agitation of the sea during a storm; and in *Geopon.* xx. 46. p. 1270, where the preparation of that sauce called *garum* is mentioned, it is said that it must be placed in the sun, and frequently shaken (πυκνως δονουμενα). Hippocrates expresses the same thing by σειειν and ταρασσειν.

---

* De Morbis, lib. iv. edit. 1595, fol. v. p. 67: Istud vero similiter se habet, ut id quod ex lacte equino Scythæ conficiunt. Lac enim in vasa lignea cava affusum agitant, conturbatum vero spumescit ac separatur, et pingue quidem, quod butyrum vocant (ὃ βουτυρον καλεουσι), cum leve sit, in summo seponitur, grave vero et crassum subsidet, quod etiam separantes siccant. Quod cum concretum et siccatum fuerit Hippacen vocant. Lactis vero serum medium locum habet. Ὁ δε ορῥος του γαλακτος εν μεσῳ εστιν. Ἱππακη is cheese made of mares'-milk, as Hippocrates himself expressly tells us in another passage; for in his treatise *De aere, locis, et aquis*, sect. iii. p. 74, he says, the Scythians drink mares'-milk and eat cheese made of it: πινουσι γαλα ἱππων και ἱππακην τρωγουσιν, τουτο δ'εστι τυρος ἱππων. More proofs may be found in *Foesii Œconomia Hippocratis*. Francof. 1588, fol. p. 285. Hesychius explains ορῥος in the following manner: το ὑδατωδες και αφισταμενον του γαλακτος. See *Foesii Œcon. Hip*. p. 463.

---

* De natura mulierum, sect. v. p. 137. De morbis mulier. 2. sect. v. p. 191, 235, and in several other places. Vossius therefore, in his *Etymolog.* p. 84, says erroneously, that this word was first used by Dioscorides.

† De morbis mulier. lib. ii. p. m. 209: Κλυζειν τῳ συν τῳ πικεριῳ: and a little after, p. 210: μετακλυσαι τῳ πικεριῳ - - - - επιχριειν τα ελκεα πικεριον.

‡ Edition of Basle 1538, fol. v. p. 715: πικεριον βουτυρον.

Phrygians called butter *pikerion*, and that the Greeks seemed to have borrowed the word from these people.[*] It however occurs very seldom, and is to be found neither in Hesychius, Suidas, nor Pollux.[†]

The poet Anaxandrides, who lived soon after Hippocrates, describing the wedding of Iphicrates, who married the daughter of Cotys, king of Thrace, and the Thracian entertainment given on that occasion, says, that the Thracians ate butter,[‡] which the Greeks at that time considered as a wonderful kind of food.[§]

It is very remarkable, that the word butter does not occur in Aristotle, and that he even scarcely alludes to that substance, though we find in his works some very proper information respecting milk and cheese, which seems to imply careful observation. At first he gives milk only two component parts, the watery and the caseous;

---

[*] Erotianus in his Lexicon, of which some account is given by Fabricius in *Biblioth. Græca*, iv. p. 571: πικεριῳ, βουτυρῳ. ὡς και Αριστοφανης εν τοις ὑπομνημασι φησιν, ὅτι Θοας ὁ Ιτακησιος ἵστορει παρα Φριξι πικεριον το καλεισθαι βουτυρον. Si quidem Aristophanes in Commentariis refert, Thoantem Itacesium narrare: βουτυρον vocari πικεριον a Phrygibus.

[†] Phavorinus, however, in his *Dictionarium magnum*, Venetiis 1712, fol. p. 603, says: πικεριον, το βουτυρον, παρα τῳ Ἱπποκρατει.

[‡] Athen. Deipnos. iv. p. 131: δειπνειν δ'ανδρας βουτυρον.

[§] Dalechamp says, very improperly, that βουκολους ought to be read instead of βουτυρον. *Casauboni Animadvers. in Athen.* lib. iv. c. 3. p. 248. Respecting Anaxandrides see *Fabricii Biblioth. Græca*, i. 666, 740.

but he remarks afterwards, for the first time, in a passage where one little expects it, that in milk there is also a fat substance, which, under certain circumstances, is like oil.*

In Strabo there are three passages that refer to this subject, but from which little information can be obtained. This author says, that the Lusitanians used butter instead of oil; he mentions the same circumstance respecting the Ethiopians;† and he relates in another place, that elephants, when wounded, drank this substance in order to make the darts fall from their bodies.‡ I am much astonished, I confess, to find that the ancient Ethiopians were acquainted with butter, though it is confirmed by Ludolfus.§ It ought to be remarked also, that, according to Aristotle, the elephants, to cure themselves, did not drink butter, but oil.[*] In this he is followed by Pliny;[†] and Ælian says, that for the above purpose these animals used either the bloom of the olive-tree, or oil itself;[‡] but Arrian, who lived a hundred years after Strabo, and who has related every thing respecting the diseases of the elephant and their cures, in the same order as that author, has omitted this circumstance altogether.[§] Is the passage of Strabo, therefore, genuine? Ælian however says in another part of his book, that the Indians anointed the wounds of their elephants with butter.[||]

---

* Historia animal. iii. 20. p. 384: παν δε γαλα εχει ιχωρα ὑδατωδη, ὃ καλειται ορῥος, και σωματωδες, ὃ καλειται τυρος. Omne lac habet succum aquosum, qui dicitur serum, et alterum corpulentum, qui vocatur caseus. P. 388: ὑπαρχει δ᾽εν τῳ γαλακτι λιπαροτης, ἣ και εν τοις πεπηγοσι γινεται ελαιωδης. Inest in lacte pinguedo, quæ in concreto oleosa fit. This is the translation of Scaliger; but by Gaza the latter part of the passage is translated as follows: quæ etiam concreto oleum prope trahit. It appears to me doubtful what εν τοις πεπηγοσι properly means. The comparison of oil occurs also in Dioscorides and Pliny. Aristotle, in all probability, intended to say that the fat part of milk was observed under an oily appearance in cheese made of sweet milk from which the cream had not been separated; and that indeed is perfectly agreeable to truth.

† Lib. iii. p. 233: αντ᾽ ελαιου δε βουτυρῳ χρωνται. Lib. xvii. p. 1176: εστι δε ελαιον, και βουτυρον και στεαρ· pro oleo habent butyrum et adipem.

‡ Lib. xv. p. 1031: Τραυμασι δε ποτον μεν βουτυρον, εξαγει γαρ τα σιδηρα. Vulneribus butyrum potum auxiliatur; ferrum enim ejicit.

§ Butyrum et caseum optimum, ubi temperatus est aer, conficere

We are told by Plutarch, that a Spartan lady paid a visit to Berenice, the wife of Dijotarus, and that the one smelled so much of sweet ointment, and the other of butter, that neither of them could

---

possunt Habessini; quo calidiores regiones alias carent, quia ob æstum difficulter congelatur: verum idoneis vasis destituti, non nisi magno labore cogunt, quippe in labro patulo lac tamdiu quatiunt, donec in butyrum coaguletur. *Histor. Æthiop.* lib. iv. 4, 13.

[*] Elephanti non omnes oleum bibunt; at qui bibunt, si quid in corpus ab hostibus adactum est, olei potu ejici prædicant. *Histor. animal.* viii. 31. p. 977.

[†] Olei potu tela, quæ corpori eorum inhæreant, decidere invenio. *Hist. Nat.* viii. 10. p. 440.

[‡] Elephantus oleæ florem (ελαιας πασας ανθος, η ελαιον αυτο) vel oleum ipsum gustans defixa tela expellit. *Hist. animal.* ii. 18.

[§] Indica. Edit. Blancardi. Amstelod. 1668, 8vo. p. 537.

[||] Ειτα μεντοι διαχριουσι τῳ βουτυρῳ αυτά; deinde butyro ungunt. *Lib.* xiii. cap. 7.

endure the other.[*] Was it customary therefore, at that period, for people to perfume themselves with butter?

Of much more importance are the remarks made by Dioscorides and Galen on this subject. The former says, that good butter was prepared from the fattest milk, such as that of sheep or goats, by shaking it in a vessel till the fat was separated. To this butter he ascribes the same effects, when used externally, as those produced by our butter at present. He adds also, and he is the first writer who makes the observation, that fresh butter might be melted and poured over pulse and vegetables instead of oil, and that it might be employed in pastry in the room of other fat substances. A kind of soot likewise was at that time prepared from butter for external applications, which was used in curing inflammation of the eyes and other disorders. For this purpose the butter was put into a lamp, and, when consumed, the lamp was again filled till the desired quantity of soot was collected in a vessel placed over it.[†]

---

[*] Adversus Colotem, p. 1109. Το μυρον και το βουτυρον.

[†] Mater. med. ii. 81. p. 107; Laudabile paratur butyrum e lacte pinguissimo, quale ovillum est; fit et ex caprino, agitato in vasis lacte, donec pingue separetur. - - - Recens etiam opsoniis pro oleo admiscetur, uti et placentis adipis vice. μιγνυται και προσοψημασιν αντι ελαιου το νεαρον, και εν τοις πεμμασιν αντι στεατος. - - - Colligitur e butyro fuligo hunc in modum. In lucernam infusum butyrum accendito. - - - εις λυχνον εγχεας το βουτυρον ἅψον - - - ubi primum absumptum fuerit butyrum, aliud subinde affundito. ὅταν δε αναλωθῃ το πρωτον βουτυρον, αλλο επιχει.

Galen, who distinguishes and confirms in a more accurate manner the healing virtues of butter, expressly remarks that cow's-milk produces the fattest butter; that butter made from sheep's or goat's-milk is less rich; and that ass's-milk yields the poorest. He expresses his astonishment, therefore, that Dioscorides should say that butter was made from the milk of sheep and goats. He assures us that he had seen it made from cow's-milk, and that he believes it had thence acquired its name.* "Butter," says he, "may be very properly employed for ointments; and when leather is besmeared with it, the same purpose is answered as when it is rubbed over with oil. In cold countries, which do not produce oil, butter is used in the baths; and that it is a real fat may be readily perceived by its catching fire when poured over burning coals.†" What has been here said is sufficient to show that butter must have been very little known to, or used by, the Greeks and the Romans in the time of Galen,* that is, at the end of the second century.

---

* Butyrus aut butyrum, utcunque nominare voles, sive masculino sive neutro genere, fit quidem, ut dictum est, ex eo quod in lacte pinguissimum est. Miror autem quo pacto Dioscorides ex ovillo et caprino confici referat. Ego namque ex bubulo hoc medicamentum fieri novi, ac proinde nuncupatum esse butyrum existimo. Βουτυρος η βουτυρον, ὅπως αν εθελης ἀρρενικως τε και ουδετερως ονομαζειν αυτην, γινεται μεν ουν εκ του λιπαρωτατου κατα το γαλα καθοτι προειρηται. Θαυμαζω δε ὅπως ὁ Διοσκοριδης εκ προβατειου φησιν αυτον και αιγειου την γενεσιν εχειν. Εγω γαρ εκ του βοειου το φαρμακον τουτο γιγνομενον οιδα, και δια τουτο νομιζω και βουτυρον καλεισθαι. De Simplic. med. facultat. lib. x. p. 151. Edit. Basil. ii. p. 134.

† Pinguem succum habet lac boum plurimum; ideoque butyrum, quod vocant, ex eo conficiunt, quod gustu solo visuque quantum in se pinguedinis habeat facile cognoscas. Quod si partem aliquam corporis eo inunxeris ac fricueris, cernes cutem pinguem

The Roman writers who give an account of the ancient Germans, all relate, that they lived principally on milk; but they disagree in one thing, because many of them tell us that they used cheese, while others affirm that they were not even acquainted with the method of preparing it.† Pliny on the other hand says, that they did not make cheese but butter, which they used as a most pleasant kind of food. He ascribes to them also the invention of it; for it is highly probable, that under the expression "barbarous nations" he meant the people of Germany: and his description of butter appears to me so clear, that I do not see how it can be doubted.‡ He very justly remarks, that,

---

non aliter ac si oleo fricuisses; præterea, si mortui animalis corium aridum eo inunxeris, eundem cernes effectum. Quinimmo homines in plerisque frigidis regionibus, in quibus oleo carent, in balneo butyro utuntur. Cernitur præterea, si ignitis carbonibus ipsum infundas, non aliter ac pinguedo flammam excitare. - - - φαινεται δε καν επ' ανθρακων διαπυρων εκχεεις αυτο φλογα ποιουν, ὥσπερ ἡ πιμελη. De aliment. facultat. iii. cap. 15. p. 54. Edit. Basil. iv. p. 340.

* Galen wrote at Rome.

† Maximam partem lacte atque pecore vivunt. *Cæsar de bello Gall.* iv. i. Major pars victus eorum lacte et caseo et carne consistit. Lib. vi. cap. 22. - - *Strabo*, lib. iv. speaking of the Britons, says: Moribus partim similes Celtis, partim simpliciores et magis barbari, adeo ut nonnulli, quamvis lacte abundent, caseum tamen non conficiant propter imperitiam.

‡ Mirum barbaras gentes, quæ lacte vivunt, ignorare aut spernere

in order to make butter in cold weather, the milk ought to be warmed, but that in summer this precaution is not necessary. The vessel employed for making it seems to have had a great likeness to those used at present; we are told at least that it was covered, and that in the lid there were holes.* What he says however respecting *oxygala* is attended with difficulties; and I am fully persuaded that his words are corrupted, though I find no variations marked in manuscripts by which this conjecture can be supported. Having made an attempt by transposing the words to discover the real sense, I found that I had placed them in the same order as that in which they had been before arranged by Dithmar, who, in his annotations on Tacitus, quotes them in the same manner as I

---

tot sæculis casei dotem, densantes id alioqui in acorem jucundum, et pingue butyrum; spuma id est lactis, concretiorque quam quod serum vocatur. Non omittendum in eo olei vim esse, et barbaros omnes, infantesque nostros, ita ungi. *Plin.* lib. xi. c. 41. p. 637.

* E lacte fit et butyrum, barbararum gentium lautissimus cibus, et qui divites a plebe discernat. Plurimum e bubulo, et inde nomen; pinguissimum ex ovibus. Fit et ex caprino, sed hieme, calefacto lacte; æstate, expresso tantum jactatu in longis vasis, angusto foramine spiritum accipientibus sub ipso ore, alias præligato. Additur paululum aquæ, ut acescat. Quod est maxime coactum, in summo fluitat; id exemptum, addito sale, oxygala appellant. Reliquum decoquunt in ollis. Ibi quod supernatat, butyrum est, oleosum natura. Quo magis virus resipit, hoc præstantius indicatur. Pluribus compositionibus miscetur inveteratum. Natura ejus adstringere, mollire, replere, purgare. Oxygala fit et alio modo, acido lacte addito in recens quod velis inacescere, utilissimum stomacho. *Plin.* lib. xxviii. cap. 9. p. 465.

would read them, and with so much confidence that he does not even hint they were ever read otherwise. Had we both been critics, this similarity might have given our conjecture perhaps more authority; but Dithmar also was a professor of the œconomical sciences.*

Oxygala was evidently a kind of cheese, the preparation of which has been best described by Columella.† In order to make it, sweet milk was commonly rendered sour, and the serum was always separated from it. Of this process Pliny speaks likewise; but he first mentions under the above name a kind of cheese formed from the caseous parts which remained behind in the butter-milk, and which when separated from it by acids and boiling, were mixed and prepared in various ways. It must in general have been sourish; for, according to the account of Galen,‡ it affected the teeth, though he mentions also another kind of cheese, under the name of *caseus oxy-*

---

* In my opinion the passage ought to be arranged as follows: —præligato. Quod est maximum coactum, in summo fluitat. Id exemptum, addito sale, butyrum est, oleosum natura. Quod reliquum est decoquunt in ollis. Additur paululum aquæ (aceti?), ut acescat. Id quod supernatat, oxygala appellant. Quo magis virus resipit, hoc præstantius indicatur. Pluribus compositionibus miscetur inveteratum. Natura ejus adstringere, mollire, replere, purgare.—Dithmar's emendation may be found in *Taciti Libel. de moribus German.* Francofurti ad Viadrum 1766, 8vo. p. 140.

† Lib. xii. 8. p. 786.

‡ De aliment. facultat. iii. cap. 16. p. 55.

galactium,* which was perfectly mild. In the *Geoponica*,† directions are given how this cheese may be kept fresh for a long time. If my reading be adopted, the medicinal effects spoken of by Pliny, are not to be ascribed to the butter, but to the sour cheese;‡ and physicians undoubtedly will be much readier to allow them to the latter than to the former. Whether Tacitus by *lac concretum*, which he says was the most common food of the Germans, meant cheese or butter I cannot examine, as we have no grounds to enable us to determine this question, respecting which nothing more can be known.§

I have now laid before the reader, in chronological order, every thing that I found in the works of the ancients respecting butter; and it is certain, from what has been said, that it is not a Grecian, and much less a Roman, invention; but that the Greeks were made acquainted with it by the Scythians, the Thracians, and the Phrygians, and the Romans by the people of Germany.|| It appears

---

* Ibid. cap. 17. p. 57.

† Lib. xviii. 12, p. 1188.

‡ See what Mercurialis, p. 38, says on this subject. In my opinion it is not necessary to read, as he proposes, *digerere* instead of *adstringere*.

§ De Moribus Germanorum, cap. 23. Conring takes particular notice of this passage; by other commentators it has been neglected.

|| On this account some conjecture, and not without probability, that the name also βουτυρος or βουτυρον is not originally Greek, but that

also, that when they had learned the art of making it, they employed it only as an ointment in their baths, and particularly in medicine. Besides the

---

it may have been introduced into Greece from some foreign country, along with the thing which it expresses. Conring, for example, is of opinion that it is of Scythian extraction. The Grecian and Roman authors, however, make it to be a Greek word, compounded of βους, an ox or cow, and τυρος, cheese, as we learn from the passages of Galen and Pliny already quoted. Cheese was known to them much earlier than butter; and it is therefore possible, that at first they may have considered the latter as a kind of cheese, as it appears that τυρος once signified any coagulated substance. The first syllable of the word, indeed, one should hardly expect, as the Greeks used the milk of sheep and goats much earlier than cow's-milk; and for this reason Schook conjectures that the first syllable was added, as usual among the Greeks, to magnify the object, or to express a superior kind of cheese. *Varro, De re rustica*, ii. 5. p. 274, says: Novi majestatem boum, et ab his dici pleraque magna, ut βουσυκον, βουπαιδα, βουλιμον, βοωπιν; uvam quoque bumammam; and we find in Hesychius: βουπαις, νεος μεγας. βουπεινα, μεγας λιμος. βουφαγος, πολυφαγος. [Vigerus, in his treatise *De præcipuis Græcæ dictionis idiotismis*, Lugd. Bat. 1680, p. 54, says also: ἱππος et βους in compositione το μεγα significant; ειωθε γαρ ἡ προσθηκη των τοιουτων ζωων το μεγεθος του ὑποκειμενου δηλουν, διον βουλιμος, &c. TRANS.] But this supposes that the Greeks preferred butter to cheese; whereas they always considered the former as of less importance, and less proper for use. The same word being still retained in most languages determines nothing; especially as the Swedes use the word *smor*, which is totally different, and which was the oldest German name, and that most used in the ninth century; and Lipsius, in an old dictionary of that period, found the word *kuosmer* butyrum, the first syllable of which is certainly the word *kuh*, a cow. See *Lipsii Epist. ad Belgas*, cent. iii. 44. edition of 1639, 8vo. p. 915. See also *Olai Wormii Litteratura Runica*, cap. 27. These etymological researches, which must always be uncertain, I shall not carry farther; but only remark that, according to Hesychius, butter, in Cyprus, where I did not expect it, was called ελφος, which word may proofs already quoted, a passage of Columella[*] deserves also to be remarked, because that author, and not Pliny, as Vossius thinks, is the first Latin writer who makes use of the word *butyrum.* Pliny recommends it mixed with honey to be rubbed over children's gums in order to ease the pain of teething, and also for ulcers in the mouth.[†] The Romans in general seem to have used butter for anointing the bodies of their children to render them pliable;[‡] and we are told that the ancient Burgundians besmeared their hair with it.[§] A passage of Clemens of Alexandria, in which he expressly says, that some burned it in their lamps instead of oil, is likewise worthy of attention.[||] It is however certain on the other hand, that it was

---

also be foreign. See *Martini Lexic. philol.* art. ***Butyrum,*** who derives ελφος from *albus.*

[*] Lib. vi. 12. p. 582.

[†] Infantibus nihil butyro utilius, per se et cum melle; privatim et in dentitione, et ad gingivas et ad oris hulcera. Lib. xxviii. cap. 19. p. 486.

[‡] A passage of Tertullian *adversus Jud.* alludes to this practice: Aliud est, si penes vos infantes in prælium erumpunt, credo ad solem uncti prius, dehinc pannis armati, et butyro stipendiati. The same words are repeated, *Adversus Marcion.* iii. 13, only the passage begins as follows: Penes Ponticos Barbariæ gentis infantes in prælium - - - -

[§] Quod Burgundio cantat esculentus,
Infundens acido comam butyro.
Sidonius Apollinaris, carm. 12.

[||] Αλλ' ὁι πολλοι δε και τῳ λιπαρῳ του γαλακτος, ὃ δε βουτυρον καλουσι, καταχρωνται εις λυχνον. Sed multi adipe lactis, quod butyrum vocant, utuntur ad lucernam. *Clemens Alexand. Pædag.* i. p. 107.

used neither by the Greeks nor the Romans in cookery or the preparation of food, nor was it brought upon their tables by way of dessert, as is every where customary at present. We never find it mentioned by Galen and others as a food, though they have spoken of it as applicable to other purposes. No notice is taken of it by Apicius; nor is there any thing said of it in that respect by the authors who treat on agriculture, though they have given us very particular information concerning milk, cheese, and oil. This, as has been remarked by other writers, may be easily accounted for, by the ancients having entirely accustomed themselves to the use of good oil; and in the like manner, butter at present is very little employed in Italy, Spain, Portugal, and the southern parts of France, where it is sold in the apothecaries' shops for medicinal purposes.* It is certain besides, that in warm countries it is difficult to preserve it for any length of time.

To conclude, I shall offer one remark, which, in my opinion, is entirely new. It appears to me, by the information which I have here collected from the ancients, that at the period when these authors wrote, people were not acquainted with the art of making butter so clean and so firm as that which we use on our tables. On the contrary, I am fully persuaded that it was rather in an oily state, and almost liquid. They all speak of butter as of something fluid. The moderns cut, knead, and spread butter; but the ancients poured it out as one pours out oil. Galen tells us, that, to make soot of butter, the butter must be poured into a lamp. Had the ancients used in their lamps hard or solid butter, as our miners use tallow in the lamps that supply them with light under ground, they would not have made choice of the expression *to pour out*. We are told that the elephants drank butter; and liquid butter must have been very familiar to the Greek translators of the Sacred Scriptures, when they could mention it as flowing in streams. Hecatæus, quoted by Athenæus, calls the butter with which the Pæonians anointed themselves, oil of milk.[*] Casaubon[†] observes on this passage, that the author makes use of these words, because butter was then employed instead of oil, and spoken of in the like manner, as was the case with sugar, which was at first considered to be a kind of honey, because it was equally sweet and could be applied to the same purposes. Hippocrates, on the like grounds, calls swine's seam swine's oil.* This explanation I should readily adopt, did not such expressions respecting butter, as one can apply only to fluid bodies, occur every where without exception. In warm countries, indeed, butter may be always in a liquid state; but I am of opinion that the ancients in general did not know by means of kneading, washing, and salting, to render their butter so firm and clean as we have it at present. On this account it could not be long kept or transported, and the use of it must have been very much limited.

---

* When Leodius accompanied the elector palatine, Frederick II, in his travels through Spain, he was desirous of purchasing in that country several articles necessary for their journey. After much inquiry concerning butter, he was directed to an apothecary's-shop, where the people were much astonished at the largeness of the quantity he asked for, and shewed him a little, entirely rancid, which was kept in a bladder for external use. *H. Th. Leodii Vita et res gestæ Frederici Palatini.* Francof. 1665, 4to. lib. vi.

---

[*] Lib. x. p. 447 : αλειφονται δε φησιν ελαιῳ απο γαλακτος.

[†] Animadversiones in Athen. x. cap. 14. p. 744.

I shall remark in the last place, that butter appears to have been extremely scarce in Norway during the ages of paganism; for we find mention made by historians of a present of butter which was so large that a man could not carry it, and which was considered as a very respectable gift.†

---

* What Hippocrates calls ελαιον ὑος Erotian explains by το ὑειον στεαρ.

† Suhm's Forsog til en afhandling om de Danskes og Norskes handel og seylads den hedenske tid. This essay may be found in the eighth vol. of the *Transactions of the Copenhagen Society*, where a reference is made, p. 53, respecting the above-mentioned circumstance, to *Torfæi Histor. Norveg.* pars i. vi. sect. iii. cap. 2. p. 319.

INDEX

TO THE AUTHORS AND BOOKS QUOTED IN THE SECOND VOLUME.

A.

ABELS Sammlung alter chroniker, 302
Abhandlungen einer privatgeselschaft in Böhmen, 5
———— *der Schwedischen Akad. der Wissenschaften*, 5. 9. 242. 318
Achmet, Introductio in astrologiam, 327
Ackeri Historia pennarum, 200
Acta Societat. Upsaliensis, 19. 348
Adami Vitæ philosophorum, 58
Adanson, Reise nach Senegal, 246
Ælianus, 42. 50. 167. 354. 380
Agricola De animantibus subterraneis, 342
——— De natura fossilium, 58
Aimonius De miraculis Sancti Benedicti, 269
Alberici Trium Fontium chronicon, 27
Albinus, Meisnische Bergchronik, 344. 369
Alcuini Opera, 206
Aldrovandi Museum metallicum, 215
———— Ornithologia, 351
Alexander ab Alexand. 52. 117
Alexius Pedemontanus De secretis, 331
Algemeine geschichte von America, 182
———— *welt-historie*, 115. 265. 363
Almanach de Strasbourg, 16
Ambrosii Traversarii Epistolæ, 212
Ames' Typographical antiquities, 332
Ammann, Stirpes rariores Imperii Russici, 242
Ammianus Marcellinus, 86. 203
Anciens et nouveaux statuts de Bourdeaux, 37
Anderson's Hist. of commerce, 29, 30. 132. 155. 182. 194. 230. 361, 365
Andreæ, Briefe aus der Schweitz, 246
Andreæ Bibliotheca Belgica, 59
Anthologia, 69
Antigoni Carystii Hist. mirabil. 353
Apicius De arte coquinaria, 51. 116
Apollonius Rhodius, 76. 285
Appianus De bello Mithridatico, 276
———— De bellis Punicis, 268
———— De bellis civilibus, 70
Apuleius, 46. 76. 248
De Aquino, Lexicon militare, 270
Archæologia, 54, 55. 270. 361
Arethas in Apocalypsin, 328
Aringhi Roma subterranea, 118
Aristophanes, 37. 67. 76. 88. 283
Aristotelis Hist. animalium, 270. 379. 404
———— Auscultat. mirabil. 324. 325. 328. 337
Armorici Hist. Philippi Augusti, 27
Arrianus in Epictetum, 273
Arriani Indica, 380
Artemidorus, 275
Astle's Origin and progress of writing, 195
Astronomica veterum scripta, 327
Astruc, Hist. nat. de Languedoc, 175
Athenæus, 67, 68. 87. 351. 378
Auctores Rei rust. 270
Avicenna, 178
Ausonius, 16. 198. 200. 285
D'Aussy, Histoire de la vie privée des François, 119

B.

BACCIUS De thermis, 92
Backmeister, Essai sur la bibliotheque à St. Petersbourg, 143
Barchausen, Historia medicinæ, 41
Barrington's (Daines) Miscellanies, 350
Bauhini Hist. plantarum, 239. 244
——— Pinax plantarum, 111. 197
——— Theatrum botanicum, 197. 239. 244. 246
Beckmann's Anleitung zur technologie, 11. 192
——— *Beschreibung der Mark Brandenburg*, 293
——— *Beyträge zur œkonomie*, 153
——— *Grundsätzen der Teutschen landwirthschaft*, 244
——— *Physikal. œkon. biblioth.* 61. 172. 186. 274. 294.
Beguillet, Description de Bourgogne, 54
Bell's Travels, 367
Bellonii Itinerarium, 168
Bambo, Historia Vinitiana, 149
Beobachtungen der Berlin. naturf. gesel. 324
Berenger's Hist. of Horsemanship, 255. 263
Bergeri Colloquium de tribus antiquitat. Græc. voluminibus, 202
Bergier, Hist. des grandes chemins de l'empire Romain, 23
Bergius, Inträdes-tal om Stockholm för, 200 ar sen, 143
——— *Polizey-und cameral-magazin*, 294
Beschäftigungen der Berlinischen Naturforschenden geselschaft, 9. 324
Beschreibung der Stadt Göttingen, 141
Beyträge, histor. zu den Preussischen staaten, 38
Biblia sacra, 2. 22. 178. 213. 281. 296. 328. 374
Binos, Reise nach Egypten, 296
Biographia Britannica, 58
Biörnstahls Briefe, 220
Biringoccio, Pyrotechnia, 219. 348
Le Blanc, Voyage, 281
Blount's Tenures, 292
Blumentrost, Haus- und reise-apotheke, 103
Bochart, Chanaan, 298. 342
——— Hierozoicon, 167. 176, 177. 281. 374
Bock, Kräuterbuch, 235
Bœhmeri Biblioth. scriptorum hist. nat. 145
Boerhavii Methodus studii medici, 106
Bohadsch De animalibus marinis, 2
Böhmers Handbuch der naturgeschichte, 145
Bonifacii Ludicra historia, 64
De Boot, Gemmarum historia, 316
Borrichii Dissertat. 193
Bouche, Chorographie de Provence, 363
——— Essai sur l'hist. de Provence, *ibid.*
Bowles, Introducion à la historia natural de Espana, 338
Boyle De coloribus, 195
Braun De vestitu sacerdot. Hebræorum, 190. 213. 312. 325
Von Breslau, Documentirte geschichte, 229
Le Bret, Geschichte von Venedig, 148
Britonis Philippidos libri, 173
Brook's Discovery of Errors in the Catalogue of the Nobility, 293
Brown, Essai sur les erreurs populaires, 255
Brown's Travels, 168
Brownrigge's Considerations on preventing pestilential contagion, 147
Bruckmann Von edelsteinen, 341
Brunichs Mineralogie, 315
La Bruyere Champier De re cibaria, 237. 365
Buddæi Sing. Lusatica, 125
Buffon, Naturgeschichte der vögel, 350
Busching's Geography, 151

C.

CÆSALPINUS, 348
Cæsar, 248. 383
Cæsarius De miraculis, 191
Calvor, Maschinenwesen am Harze, 347
Cancrinus, Beschreibung der vorzüglichsten bergwerke, 223
Du Cange, Glossarium, 86. 97. 254. 267
Capitolinus, 80
Cardanus De subtilitate, 348
Cardonne, Geschichte von Africa, 25
Cary, Bemerkungen über Grossbritanniens handel, 195
Cassiodorus, 209
Casauboni Animadvers. in Athenæum, 87. 378
Cato De re rustica, 79. 86. 116
Catullus, 196. 270. 274
Celsus De medicina, 223
Chabræi stirpium Sciagraphia, 239
Chardin, Voyages, 84. 168. 198. 317. 368. 372
Charpentier, Glossarium novum, 118
Chenot De peste, 151

Chifletii Anastasis Childerici, 287
Christs Verzeichniss zu Lipperts Dactyliotheca, 323
Ciaconii Bibliotheca, 331
Cicero, 43. 52. 75. 86. 89. 215
Ciesa, Reise, 358
Cinnamus De rebus gestis Imperat. 277
Clemente, Trattato dell' Agricoltura, 360
Clementis Alex. Opera, 201. 388
Le Clerc, Biblioth. ancienne et moderne, 65
Clusii Rar. plant. historia, 111. 272
Cobresianæ deliciæ, 61
Codex Theodosianus, 123. 251. 300
—— Justin. 251. 253
Colerus, Hausbuch, 366
Cölnisches Wochenblatt, 57
Columella, 51. 72. 76, 77, 78. 86. 116. 272. 353. 385. 388
Columnæ Observat. aquatil. 49
Commentat. Instituti Bononiensis, 271
———— Societat. Gottingensis, 340
Conringius De antiquitat. Academicis, 127
———— De habitu corporum Germanorum, 373
———— De hermetica medicina, 126
Conringii Introductio in artem medicam, 144
Constantinus Africanus De gradibus simplicium, 328
———— De ceremoniis aulæ Byzant. 65. 96. 143. 190. 270
Coquille, Hist. de Nivernois, 303
Cordus (Valer.) Sylva observationum, 58
Corippus De laudibus Justini II, 51
Cornarius in Dioscoridem, 180
Cornelius Nepos, 52
Courtépée, Description de Bourgogne, 17. 28. 362
Cramers Geschichte der Herculanischen entdeckungen, 25
Crescentio D'Agricoltura, 246. 360
De la Croix, Relation d'Afrique, 369
Curtius, 51

D.

VON DALIN, Geschichte von Schweeden, 142
Dampier's Voyages, 368
Daniel, Hist. de France, 292
Dappers Beschreibung von Asia, 199
Dart's Antiquities of Westminster, 54
Delaval On the cause of the change of colours in opake bodies, 167. 339
Les Delices de la Hollande, 306
Dictionarium Latino-German. 241
Digesta, 30, 31. 79. 90. 123. 300
Dillon's Travels through Spain, 191
Dio Cassius, 47. 249. 273
Diodorus Siculus, 21. 50. 277
Dionysii Periegesis, 245. 320
Dioscorides, 165. 199. 236. 320. 324. 381
Dithmar ad Tacitum de moribus Germanorum, 384
Donizonus Vita Mathildis, 292
Doppelmayr Von Nürnbergischen künstlern, 160. 225
Dornavii Amphitheatrum Sapientiæ, joco-seriæ, 64
Douglas, Bibliographiæ anatom. specimen, 259
Von Dreyhaupts Beschreibung des Saal-Creyses, 140
Duchesne, Historiæ Scriptores Francorum, 27
Dugdale's Origines juridiciales, 361
Duhalde, Description de la Chine, 339
Duhamel, Abhandlung von blumen und stauden, 109
———— Traité des pêches, 16
Duroi, Harbkescher baumzucht, 113

E.

EBERI Vocabula rei numariæ, 241
Ehrharts Œkonomische plfanzen-historie, 243
Encyclopédie, 16. 65. 154. 223. 311
Encyclopedie, Deutsche, 65
Eobani Hessi Urbs Norimberga, 223
Epiphanius De XII gemmis, 320
Erotiani Lexicon Hippocratis, 378
Erpenii Hist. Saracenica, 26
Evagrii Hist. ecclesiastica, 146
Eunapius, 48
Eutropius, 251. 262
Excerpta auctoris ignoti de Constantio et aliis imperatoribus, 203

F.

FABER, Archæologie der Hebräer, 23. 85
Fabretti De columna Trajani, 278
Fabricii Bibliograph. antiquaria, 64
——— Bibliotheca antiquaria, 195. 200
——— Biblioth. Græca, 327. 378
——— Biblioth. med. et inf. ætatis, 259. 264
——— Codex pseudepigraphus Vet. Testamenti, 297
Fabricius, Briefe aus London, 6. 9.

Falk, Beyträge zur topographischen kenntniss des Russischen Reichs, 315
—— *Reise durch Russland*, 243
Fallopii Opera, 259
Fallopius De metallis, 329
Febure, Traité de la Chemie, 103
Felibien, Hist. de la Ville de Paris, 28. 135
Ferbers Briefe aus Welschland, 339
Fernandez, Hist. animal. Novæ Hispaniæ, 358
——— Thesaurus rerum medic. *ibid.*
Ferrarii Electorum libri, 64
Festus, 25. 295.
Fischers Geschichte des Teutschen handels, 173
Fœsii Œconomia Hippocratis, 376
Forskal, Flora Ægyptiaco-Arabica, 200. 244
Forstmagazin, 294
Fredericus II De arte venandi, 269. 267
Frisch, Beschreibung aller insekten, 178
——— *Teutsches Wörterbuch*, 179. 240
Fritschii Corpus juris ven. forest. 303

G.

GALENUS, 79. 258. 273. 382, 383. 385. 390
Garidel, Hist. des plantes qui naissent aux environs d'Aix, 168
Garzonni, Piazza universale, 100. 219
Gellius, 124
Geoponica. 48. 236. 375
Gerber Stirpes rariores Im. Russici, 242
Gerken, Anmerkungen über die siegel, 269
Gervasii Tilberiensis Otia Imperialia, 172
Gesneri Bibliotheca, 59. 331
——— Epistolæ medicinales, 331
——— Historia avium, 351. 366
——— Historia naturalis, 3
——— Libellus de lacte, 374
——— Thesaurus linguæ Lat. 253
Gesner De omnium rerum fossilium genere libri, 60
Glorez von Mähren, Haus-und land-bibliothek, 158
Glossarium manuale, 125. 307
——— novum, 118
Gmelin, Reise durch Russland, 113
Gobet, Anciens mineralogistes de France, 331
Goguet, Vom ursprunge der gesetze, 216
Goldasti Constitutiones Imperiales, 137
Googe's Art of Husbandry, 361
Goropius Becanus, Francicorum liber, 254
Göttingische Chronik, 141
Göttingische Gelehrte anzeigen, 147
Grævii Thesaurus antiq. Rom. 31
Le Grand d'Aussy, Histoire de la vie privée des François, 117. 119. 239. 365
Grapaldus De partibus ædium, 72
Gratii Cynegeticon, 188
Von Griescheims Anmerkungen über den tractat: Die Stadt Hamburg, 38
Grignon, Bulletin des fouilles d'une ville Romaine, 222. 232
Gronovii Thesaurus Antiquitat. Græcarum, 202
Grotius De Antiquit. reipub. Batavicæ, 306
Grundig, Nachricht zur Sächsischen geschichte, 300
Grupens Origines Hannoverenses, 140
Gruteri Thesaurus criticus, 255
Guicciardini Belgicæ descriptio, 306. 344
Guys, Voyage de la Grèce, 85

H.

HAKLUYT's Voyages, 357. 361. 368
Hallens Werkstate der künste, 138. 231
Halleri Biblioth. botanica, 61. 107. 144. 159. 331. 362
Hamelmann, Oldenburgische chronik, 140
Hamilton, Entdeckungen zu Pompeii, 116
Hannoverische gelehrte anzeigen, 61. 97
Hanway's Travels, 199
Hartwigs Handwerke und künste, 154
Hasæi Dissertat. de doliari habitatione Diogenis, 76
Hawkesworth's Account of the Voyages to the South Sea, 36
Heerkens, Aves Frisicæ, 207
Von Heinecken, Nachrichten von künstlern, 158
Heineccius De sigillis, 269
Helmodii Chronicon Slavorum, 173
Helvetius De l'esprit, 366
Heresbach De re rustica, 238. 366
Heringius De molendinis, 65
Hermann, Abritz der Oesterreichischen staaten, 120
——— *Beyträge zur physik-œkon. der Russischen länder*, 274
Herodotus, 47. 52. 66. 245. 298. 374
Herrera, Historia de los hechos de los Castellanos, 182
Hesiod, 77
Hesychius, 188. 236. 376
Heumanni Pœcile, 76

Hieronymus, 49
Hippocrates, 223. 258. 376, 377. 391
Histoire de l'Acad. des Sciences, 5. 13
——— de l'Acad. de Berlin, 194
——— générale des voyages, 281. 367
——— naturelle de cochenille, 185
Historia comitum Lossensium, 307
——— Schneebergensis, 313. 346
Von Hoffmann, Abhandlung über die eisenhütten, 346
Hoffmanni Lexicon, 262
Homer, 65. 79. 213. 217. 269. 283. 285. 290
Horace, 1. 72. 76. 81. 86. 112. 116. 202
Hornii Henricus Illustris, 301
Houghton's Husbandry and trade improved, 230
Hubner's Geography, 151
Hübners Genealogische tabellen, 106
Hugo De militia equestri, 255
Hygini Fabulæ, 247

J.

JABLONSKI, Pantheon Egypt. 201
Jacobson, Schauplatz der manufact. 154. 231
——— *Technologisches Wörterbuch*, 231
Jenisii Annaberga, 302. 313
Illustrium virorum epistolæ ad Joannem Reuchlin, 211
Jochers Gelehrten-Lexicon, 331
Josephus, 22. 50. 297
Joubert, Dictionnaire des arts, 16. 100. 133
Journal von Freyherrn von Bibra, 226
Journal œconomique, 157. 271
Isidori Origines, 21. 47. 75. 205. 253. 311. 320
Ives Reise nach Indien, 147
Juliani Opera, 93
Jungii Disquisitiones de reliquiis, 232
Junii Batavia, 306
Juvenal, 31. 70. 73. 75. 201

K.

KÆMPFER, Histoire du Japon, 281
Kalms Reise nach dem Nördlichen Amerika, 262. 359
Kennet's Parochial Antiquities, 354
Kestneri Bibliotheca medica, 145
Keyslers Reisen, 365
Kindersley's (Mrs.) Letters from India, 233
Kircheri Prodrom. Copticus, 177
Klotzsch, Sammlung zur Sächsischen geschichte, 343
Krünitz, Encyclopedie, 51. 113. 294
Kunde, Darstellung der anspruche des grafen von Bentheim-Tecklenburg auf die herrschaft Bedbur, 308
Kunkels Glasmacher-kunst, 161. 348

L.

LABAT, Reise nach Welschland, 111
De Laet, Novus Orbis, 358
Lambeck, Prodromus histor. litterat. 202
Lampridius, 24. 82. 215. 217. 249
Lancellotti, L'Hoggidi, overo Il mondo non peggiore del passato, 150
Lange, Philologia Barbaro-Græca, 290
Latham's Synopsis of birds, 361
Leges XII tabularum illustratæ à Funcio, 223
Lehmann's Cadmiologia, 346
——— *Hist. schauplatz des Oberertzgebirges*, 313
Leibnitii Collectanea etymologica, 179
——— Scriptores Brunsvicenses, 172. 292
Lejisugo, Bericht von golddratziehen, 220. 234
Leland's Itinerary, 271
Leodii Vita Frederici Palatini, 389
Leonardus Camillus De lapidibus, 329
Leonis Africæ descriptio, 272
——— Grammatici Chronographia, 267
——— Tactica, 254. 265. 266. 289
Leontius De constructione Areteæ spheræ, 327
Leroy, Mémoires sur les travaux à l'exploitation de la mâture, 294
Lersners Chronica der Stadt Frankfurt, 40. 137. 261
Letters from Scotland, 35
Lettres édifiantes, 281
Letzner, Dasselsche chronik, 141
Licetus De lucernis, 255. 269
Lindenbergii Codex legum antiquarum, 127
Linnæi Flora Suecica, 113
Lipsii Epistolæ, 64. 387
Lipsius De militia Romana, 247. 255. 262
Lister, Exercitatio Anatomica de cochleis, 10
Livius, 23, 24. 55. 247. 263
Lobelii Stirpium adversaria, 239
Löflings Reisebeschreibung, 272
L'Hoggidi overo il mondo non peggiore, ne più calamitoso del passato, 150
Lopez de Gomara, Hist. de Mexico, 357

Lucianus, 280
Lucretius, 21. 51. 263
Ludolfi Hist. Æthiop. 281. 379
Ludwig, Institutiones chirurgiæ, 223
Ludwig, Neueste wilde baumzucht, 120
——— *über die guldene bulle,* 101
Lunig's Codex diplom. Germaniæ, 191
Lycophron, 76

M.

MABILLON De re diplomatica, 206
Macrobius, 1. 248
Magii Miscellanea, 255
Manutii Commentar. in Ciceronis epist. 65
Marbodeus De lapidibus, 341
Marbres antiques dans la galerie de Dresde, 339
De la Marc, Traité de la police, 28. 31. 33. 35. 37. 183. 304. 350. 365. 374
Mariti Reisen durch Cypern, 168
Marsden's Hist. of Sumatra, 233
Martial, 31. 80. 196. 216
Martini, Auflebendes Pompeii, 25. 116
——— Lexicon philolog. 65. 240
Martius De promiscua doctrina, 263
Marxens Neu-vermehrte materialkammer, 161
Massarii Castigationes in Plinium, 12
Maternus von Cilano, Abhandlung der Römischen alterthümer, 65
Mathesius, Bergpredigten, 342
Matthioli Opera, 236
Matthiolus in Dioscoridem, 174
Mauricii Ars militaris, 254. 265, 266. 289
Mauritius De statutis Cluniacensibus, 191
Maxima bibliotheca Patrum, 205
Maximus Tyrius, 124
Mead De peste, 148
Meiners, Lebensbeschreibung berühmter männer, 210
Mélanges historiques, 248
Melzer, Beschreibung der Stadt S
berg, 313. 345, 346
Mémoires de l'Académie des S
350
——— de l'Académ. des Ins
249. 256. 270
——— de l'Académie des S
à Troyes, 36
——— d'agriculture, 272
Menage, Diction. étymologique
193. 231, 232. 343
Menagiana, 255. 264
Mercati Metallotheca, 12. 61
Mercurialis De arte gymnastica, [illegible]
Mercurialis Variæ lection. 51
Merret De arte vitriaria, 349
Meursii Glossarium Barbaro-Græcum, 290
Michaelis Mosaisches recht, 374
——— Supplementa ad Lexica Hebraica, 325. 374
Miller's Gardener's Dictionary, 111. 186. 198
Minschæi Ductor in linguas, 371
——— Emendatio Ductoris in linguas, *ibid.*
Miscella antiquæ lectionis, 203
Mohsen, Beytrage zur geschichte der wissenschaften in Mark Brandenburg, 58. 120. 132. 138
Molleri Cimbria litterata, 64
——— Dissertat. de technophysiotameis, 59
Monconny's, Voyage, 168, 193
Montamy, Abhandlung von den farben zum porzellan, 318
Montfaucon, L'Antiquité expliquée, 65. 247. 251. 255. 370
——— Monumens de la monarchie Françoise, 269. 287
——— Palæograph. Græca, 202
Von Münchausens Hausvater, 159
Muratori, Antiquit. Italiæ, 65. 94. 98, 99. 173. 218. 292. 327
——— Rerum Italicarum scriptores, 292
Von Murr, Beschreibung von Nürnberg, 222
——— *Journal der kunst-geschichte,* 125. 219. 226
Musæum Calceolarianum, 61
Mylius, Physikalische belustigungen, 185

N.

NARRISCHE Weisheit, 193
Nazarius, 252
Nemeitz, Sejour de Paris, 158
Neri, De arte vitriaria, 348
anns Chemie, 9. 130
as, 251. 267. 288
Beschreibung der Stadt [illegible]
99. 138
Reise, 277
Marcellus, 218. [illegible]
De morb. curat. [illegible]
ck's Hist. of London, [illegible]
[illegible] dignitatum, [illegible]

O.

OBSEQUENS, Julius, De prodigiis, 43
Œcumenii Commentaria in Nov. Testamentum, 328
Œkonomische nachrichten der Schlesischen Geselschaft, 366
Offerhaus, Histoire universelle, 265
Olearcus, Reisebeschreibung nach Jerusalem, 84
Olivus De collectaneis musei Calceolar. 61
Origny, Diction. des origines, 155. 230
Orosius, 43
Osbecks Reise, 272
Othon. lex rabbinica, 85
Ovid, 25. 76. 214. 247. 285
Oviedo, Hist. des Indes, 183. 356

P.

PALISSY, Oeuvres de, 60
Palladius De re rustica, 90
Pallas, Spicilegia zoologica, 350
Pancirollus De rebus deperditis, 65. 250. 270
Papon, Histoire de Provence, 179
Pariser Kunst-historie, 223
Patin, Relations hist. de Voyages, 248
Pausanias, 2. 44. 114. 165
Paw, Recherches philosoph. sur les Egyptiens et Chinois, 338
Pennant's Arctic zoology, 350
——— Birds, *ibid.*
Perrault, Hist. nat. des animaux, 350
Perroniana, 370
Perrot, Diction. de voierie, 28. 34. 35
Pertuchii Chronicon Portense, 301
Petri Venerabilis Epistolæ, 207
Petronius, 65. 118. 168
Pezronii Antiquit. Celticæ, 189
Pezzii Thesaurus anecdotorum, 179
Phavorini Diction. magnum, 378
Phile De animal. proprietat. 167. 270.
Philosoph. Transactions, 350
Philostorgii Hist. ecclesiast. 49
Philostrati Vita Apollonii, 3. 45. 245
Phlegon Trallianus, 48
Photii Bibliotheca, 167
Pindar, 285. 297
Pirkheimeri Opera, 211
Pitisci Lexicon Antiquit. Roman. 65. 255. 262. 295
Placcii Theatrum anon. 241
Plautus, 72. 253. 311
Plinii Epistolæ, 117
Plinii Hist. naturalis, 1. 41, 42, 43, 44. 46, 47. 49. 52. 55. 73. 79. 89. 111, 112, 113, 114. 124. 166. 196, 197. 200. 207. 214, 215, 216. 236. 244. 247. 270. 272. 295. 299. 320. 322. 325. 336. 353. 380. 384. 388
Plutarchus, 22. 48. 51, 52. 81, 82. 115. 261. 380
Pocock's Travels, 53
Pollio (Trebellius), 80
Pollucis Onomasticon, 79. 263. 265. 285. 354
Polyænus, 21
Pomet, Materialist, 102. 161
Pompa De instrument. fundi, 117
Pontani Hist. Gelrica, 191
Pontoppidan. Naturhist. von Dannemark, 367
Porcacchi Funerali antichi, 262
Porner, Anleitung zur färberkunst, 192
Portæ Magia naturalis, 348
Potter's Archæologia Græca, 255
Pouget, Traité des pierres precieuses, 14, 18
Prevotii Selectiora remedia, 104
Priap. 76
Procopius, 146

Q.

QUINTILIANUS, 52. 76

R.

RABANI Mauri Poemata, 209
Rabelais, 193
Raccolta d'Opuscoli scientifici, 65
Raii Hist. plantarum, 245
—— Synopsis quadruped. 49
Ramusio, Navigat. e viaggi, 356
Ravanelli Biblioth. sacra, 167
Rauwolf's Travels, 199. 245
Raynal, Hist. des etablissemens dans les Indes, 182
Raynaudus De incorruptione cadaverum, 53
Reimanni Idea Systematis antiquitat. litterariæ, 195
Rhodiginus, 269
Riccii Opera, 330
Ricettario di dottori del collegio Fiorentino, 144
Rigordus De gestis Philippi Augusti, 27
Rinmann, Geschichte des eisens, 316
Robortellus De ruinis balnearum Pisanæ urbis, 92
Roland de la Platière, Encyclopédie des manufactures, 272, 311
Rolt's Dict. of Trade, 332

Römers Neues magazin für die botanik, 243
Rossler Speculum metallurgiæ, 346. 349
Rossotti Syllabus scriptorum Pedemontii, 381
Royer, Voyage de la Terre Sainte, 168
Rudolphi Gotha diplomatica, 301
Ruellius De nat. stirpium, 112. 238. 243
Rymeri Fœdera, 155

S.

SAGE, Examen chymique des mineraux, 18, 316
Saintfoix, Geschichte von Paris, 35
Salmasius in Solinum, 175
Sammlung der Hamburgischen gesetze, 136
Sandi (Vettore), Storia di Venezia, 149
Sattlers Geschichte von Wirtemberg, 184, 185
Savary, Diction. de commerce, 154. 230. 300. 332.
Sauval, Hist. de la ville de Paris, 35. 134
Scaliger De subtilitate, 44. 180
Scappi Opera, 360
Schauplatz der künste, 272
Scheffer De militia navali veterum, 123. 295
——— De re vehiculari, 253. 273
Scheuchzeri Nova litteraria Helvetica, 332
Schoneveldi Ichthyologia, 16
Schook De butyro, 373
——— De cervisia, 239
Schlözers Briefwechsel, 6
Schmidt, Chronica Cygnea, 230. 301. 313
Schrebers Sammlung der Cameral schriften, 181
——— *Sammlung zu den ökonomischen wissenschaften*, 7
Schulze, Dissertat. de granorum kermes usu, 174
Schumacher, Nachrichten zur Sächsischen geschichte, 140
Schwandtner, Scriptores rerum Hungaric. 106
Schwarz, Exercitat. de varia supellectile rei librariæ veterum, 207
Schwarzius De butigulariis, 119
Schweigers Reisen, 84
Schwenkenfeld, Teriotroph. Silesiæ, 367
Schlözer Von unschädlichkeit der pocken in Russland, 92
Scriptores rei rusticæ, 117
Scylacis Periplus, 353
Seelen, Selecta litteraria, 240
Seneca, 71. 75. 89. 248
Serapion De simplic. medicinis, 170
Servius ad Virgilium, 75
Sextus Empiricus, 47
Sidonius Apollin. 86. 113. 253
Sigeberti Acta St. Guiberti, 48
Silius Italicus, 216. 247. 263
Smyth's Tour in America, 359
Socrates, 251
Spielmann, Institutiones chemiæ, 316. 330
Spittler, Geschichte von Hannover, 141
Sprengels Handwerke und künste, 220. 223
Statius, 28. 50. 89. 247
Stephani Prædium rusticum, 112. 119. 243
Stephani Thesaurus, 114
Von Stettens Kunstgeschichte der stadt Augsburg, 30. 57. 125. 135. 219. 283
Stiler, Stammbaum der Teutschen sprache, 190
Stoever, Leben von Linné, 7
Strabo, 21. 44. 50. 268. 295. 353. 379. 383
Stypmann De jure maritimo, 305
Suetonius, 2. 45. 71. 86. 258. 273. 275
Suhms Försög om Danskes handel, 391
Suidas, 113. 268
Swedenborgius De cupro, 316
Swertii Athenæ Belgicæ, 59
Symmachi Epistolæ, 300

T.

TABLEAU de Paris, 101
Tacitus, 385, 386
Talmud, 28
Tavernier, Reisen, 84. 281. 316
Teinturier parfait, 194
Tentori, Storia di Venezia, 149
Du Tertre, Hist. des Antilles, 15
Tertullianus, 72. 86. 166. 216. 388
Thevenot, Voyages, 281
Tiraboschi Biblioth. Modenese, 330
Theophrasti Hist. plantarum, 79. 110. 111, 112. 236. 245
Theophrastus De lapidibus, 320. 336
Thesaurus antiquitat. Italiæ, 150
Thomans Reise und lebensbeschreibung, 233
Thomasii Dissertationes de jure circa pharmacopolia civitatum, 120
——— Dissertationes academicæ, *ibid.*

Thucydides, 146
Thunberg, Resa uti Europa, Africa, Asia, 282
Tiraboschi Biblioth. Modenese, 330
Toletanus De rebus Hispanicis, 191
Topografia Veneta, 151
Torfæi Hist. Norveg. 391
Tournefort, Institut. rei herbariæ, 198
——— Voyages, *ibid.*
Tozetti Viaggi, 109
Traité De la culture du nopal, 186
Transactions of the Copenhagen Society, 391
Trebellius Pollio, 80. 262
Tryphiodorus, 285
Turnebi Adversaria, 53
Tusser's Five Hundred Points of Husbandry, 361
Tyson's Anatomy of a pigmy, 167
Tzetzes, Chiliades, 4. 11

V.

VALERIUS Maximus, 22. 43, 44. 215
Valentini Museum museorum, 56. 61
De la Valle, Reisen, 82
Varrenne de Beost, L'Art d'imiter les perles, 16
Varro De lingua Latina, 25
—— De re rustica, 48. 111. 236. 355. 387
Vegetius De arte veterinaria, 123. 253. 255. 272. 277. 281
——— De mulomedic. 123
——— De re militari, 261
Vergilius, Polydorus, De rerum inventor. 97. 255
La Vie de Jean-Bapt. Colbert, 313
Vigerus De Græcæ dictionis idiotismis, 387
Villani, Historie Florentine, 98
Virgil, 72, 73. 77. 247. 249. 260. 285
Vitruvius, 2. 73. 92. 299
Volkmann, Silesia subterranea, 161
Voltaire, 101
Volaterrani Comment. urbani, 354
Vopiscus, 40. 187. 204. 217
Vossii Etymologicon, 374. 377
Vossius De vitiis sermonis, 191. 255

U.

UEBER sitten, temperament und gerichtshöfe Spaniens, 183
Universal Lexicon, 103
Uytwerf, Natuerlyke historie van cochenille, 185

W.

WALSH, Naturgeschichte der versteinerungen, 57
Wallaszky, Conspectus reipub. litter. Hungariæ, 103
Wallerii Lucubratio de system. mineralogicis, 57
——— Systema mineralium, 324. 348
Waltheri Dissertat. de butyro, 374
Weckens Beschreibung Dresdens, 142
Weeks Dresdner Chronik, 302
Weinarts Geschichte Dresdens, 142
Weisser Von Wirtemberg. gesetzen, 135
Weszpremi Medicorum Hungariæ biographia, 103. 105
A Weyhe, Parergon de camino, 64
———— De speculi origine, *ibid.*
———— Aulicus politicus, *ibid.*
Winkelmann Von bädern der alten, 63
———— Description des pierres gravées du Baron de Stosch, 276. 278
Winkelmann's Letters on Herculaneum, 199, 200. 222
Wittenbergisches Wochenblatt, 367
Wormii Litteratura Runica, 387

X.

XENOPHON, 50. 115. 248, 249. 251. 257. 274. 281. 283
Ximenes, Hist. Arabum, 26

Z.

ZANETTI Dell' origine di alcune arti appresso i Veneziani, 65. 94. 98
Zanon, Lettere dell' agricoltura, 360
Zapatæ Mirabilia, seu Secreta medico-chirurgica, 106
Zonaras, 251
Zosimus, *ibid.*
Zwickauische chronik, 313

INDEX

TO THE MOST REMARKABLE THINGS MENTIONED IN THE

SECOND VOLUME.

A.

ABLES, ablettes, a fish, the scales of which are used for making artificial pearls, 16

Æs ductile, explanation of it, 214

Agni Dei, how ornamented by the nuns, 161

Agricola, George, his collection of natural curiosities, 58

Alcuin, a poet of the 8th century, his inscription for a writing-study, 206

Alburnus of Ausonius, perhaps the bleak, 16

Alexander, how his body was embalmed, 50. Anecdote of him, 81

Alexius Pedemontanus, an account of him, and his real name, 331

Alkali, volatile, preserves pearl-essence, 18

Alkermes, origin of the name, 175

Althelmus, or Aldhelmus, his poem on a writing-pen, 206

American productions received diminutive names from similar Spanish productions, 181

Ancorale, a buoy, 113

Antilena and *Antella*, meaning of these words, 253

Apicius unacquainted with butter, 389

Aplysia, sea-hare, pearls found under its shield, 2

Apotheca, its various meanings, 125

Apothecaries, 121. Greek and Roman physicians prepared their own medicines, 122. *Pigmentarii, seplasiarii, pharmacopolæ* and *medicamentarii*, account of, 123. Oldest meaning of *Apotheca* and *Apothecarius*, 125. Apothecaries, their employment in the 13th and 14th centuries, 126. Pharmacy first separated from medicine by the Arabian physicians, 127. Medicine edict issued by the emperor Frederic II for the kingdom of Naples, *ibid*. Some extracts from it, 128. Constantinus Afer, some account of him, 129. Medical establishments in Europe, formed after that at Salerno, 130. English apothecaries, 132. Apothecaries in France, *ibid.* Apothecaries in Germany, 133—142. Gustavus Erickson, King of Sweden, sent to Dr. Audelius of Lubec for an experienced physician and good apothecary, *ibid.* When he died, had no other physicians with him than his barber, master Jacob; an apothecary, master Lucas; and his confessor, magister Johannes, *ibid.* Portable apothecary's shop at the Byzantine court, 143. First dispensatorium, 144

Apuleius, his fondness for natural history, 46

Aqua-vitæ, when that term began to be used, 106

Archal, the inventor of brass-wire, 230

Armenian-stone, supposed by some to be the *lapis lazuli*, 324

Arsenick, not known to the ancients, 338

Arts, their connection, 156

Arundo scriptoria of Bauhin, not sufficiently characterised, 197

Asia proconsularis, 166

Astraba, a stirrup, 267

Atrium, origin of that word, 75

Attalus, his cloth, what it was, 216

Azurum, azur, 329, 339

B.

BARRINGTON (Daines), his error respecting turkeys, 369

Baths of the ancients, how heated, 93

Besoms made of holcus, 245

Berenice, wife of Dijotarus, anecdote respecting her and a Spartan lady, 380

Bismuth, unknown to the ancients, 338

Bleak, its scales employed for making artificial pearls, 16

Blue glass of the ancients, from what it received its colour, 340

Bodies, dead, how preserved by the ancients, 47, 49, 52

Boniface, marquis of Tuscany, had horses shod with silver, 291

Bottles, glass, when they came into use, 117.—Origin of the name, 118

Bourgeau, kind of shell-fish, 14

Boutique, derivation of it, 125

Bow-dye, name given to scarlet in England, 194

Brackenhofer, his Collection of Natural Curiosities, 61

Brandt discovered cobalt to be a semimetal, 349

Breitkopf, his paper-hangings, 153

Brewer, a Fleming invited to England by K. Charles II to improve the art of dyeing scarlet, 194

Brewers, tax paid by them for the use of water, 307

Bucharia produces lapis lazuli, 315

Buck-wheat, 234. Opinions of the old botanists respecting it, 235. Was not known to the ancients, 236. Introduced into Europe in the beginning of the 16th century, 237. Said to have been brought from the northern part of Asia, 238. Not mentioned by Crescentio, who lived in the 13th century, 239. Why called *heidenkorn* (heath-corn) 240. Conjectures respecting other names given to it, 241. When cultivated in England, 242. Account of a new species of it, *ibid.* Sows itself in Siberia, for four or five years, by the seeds that drop, 243. Additional remarks, 244—245. Difficult to be cultivated, 246

Butter, 372. The component parts of milk, and production of butter, explained, 373. Whether butter was known to the Hebrews, examined, 374. Passage in the Proverbs respecting it, wrongly translated, 375. Oldest mention of it in Greek writers, *ibid.* Was known to the Scythians, *ibid.* Called by Hippocrates *pikerion*, 377. That word not to be found in Hesychius, Suidas, or Pollux, 378. Butter eat by the Thracians, at the wedding entertainment of Iphicrates, *ibid.* Used by the Lusitanians instead of oil, 379. Elephants drank it, *ibid.* Anecdote concerning it, related by Plutarch, 380. Account given of it by Dioscorides and Galen, 381, 382. Invention of butter ascribed by Pliny to the Germans, 383. *Oxygala* and *Caseus oxygalacticus* explained, 385, 386. Derivation of the word *butyrum*, 388. That expression first used by Columella, *ibid.* Various uses to which butter was applied by the ancients, *ibid.* Little employed at present in Italy, Spain, and Portugal, 389. Butter of the ancients was fluid, and not hard like ours, 390. Butter scarce in Norway, during the ages of paganism, 391

C

CACTUS, cochineal plant, 183
Cadmia, different meanings of that word, 335
Cæruleum of the ancients, what it was, 325
Calamus, a writing-quill, 207
Camarina, wood floated there, 298
Camels had a kind of shoes put upon their feet to preserve their hoofs during journeys, 271
Caminus, meaning of, 73
Carmesin, *cramoisi*, *carmin*, derivation of, 176
Da Carraro, Francesco, Lord of Padua, first caused a chimney to be constructed at Rome, 99
Carthaginians had the first paved streets, 21
Centrum, in a stone, what it meant, 322
Chardin, his description of the reeds used in the East for writing, 197
Charlatan, origin of the word, 190
Cheese, a component part of milk, 373. Known earlier than butter, 378

Childeric, horse-shoe found in his grave, 287

Chimneys, 62. No traces of chimneys discovered at Herculaneum, 63. Principal writers on the antiquity of them, 64—66. Passages in the Greek authors supposed to allude to them, 66—69. Passages in the Roman authors, 70—72. Meaning of the word *caminus*, 73. Houses of the ancients had no chimneys, and were much exposed to smoke, 75. How the ancients hardened their wood, 77. Methods employed to prevent it from smoking, 79, 81. In what manner they warmed their apartments, 82. Extravagance of Heliogabalus, *ibid.* Description of the stoves used in Persia, 83. Derivation of the word chimney, 88. Houses of the ancients kept warm by pipes inclosed in the walls, 89. Winkelmann's description of ancient stoves found in a ruined villa, 91. *Caminatæ*, supposed by Du Cange and Vossius to mean apartments with chimneys, 94. This opinion false, 95. No chimneys in the 10th, 12th, and 13th centuries; proved from the *ignitegium*, or *couvre-feu*, 96. The oldest account of chimneys, in an inscription at Venice, 98. First chimney-sweepers in Germany came from Savoy and Piedmont, 100. Chimney-sweeps at Paris Savoyards, 101

Chrysocolla of the ancients, what it was, 337

Cleaning the streets of Paris, and other cities, 31—35

Cleomenes, anecdote of him, 50

Cleopatra dissolved her pearls in vinegar, 1

Cloacæ of Rome, 30

Clostra, said to mean stirrups, 263

Clothes embroidered with gold, antiquity of them, 215

Cobalt, 333. Is melted with siliceous earth and pot-ashes, to a kind of blue glass called smalt, *ibid.* Ground smalt, or powder-blue, *ibid.* Meaning of the word *cadmia* uncertain, 335. Cobalt not known to the ancients, 338. Reason why Lehmann, Paw, and others, think that the ancients used smalt, *ibid.* Mr. Gmelin's experiments on the blue of the ancients, 340. Origin of the name cobalt, 342. First colour-mills in Germany for grinding smalt, 344. Smalt not mentioned in books till a late period, 347. The oldest description of it to be found in the works of Biringoccio, 348

Cobalus, a spirit said to haunt mines, 342

Coccinella, the lady-cow, 167

Coccus cacti, American cochineal, 164

Coccus ilicis, known to the ancients, 164. How collected, 170

Coccus radicis, not known to the ancients, 177. Collected by the convents, 178. Called St. John's blood, 179

Cochineal. *See* Kermes

Cœur, James, account of him, 363

Confectionarii, their employment, 128
Constantinus Afer, account of him, 129
Coppus, a measure, 178
Coques de perles described, 14
Cordova, streets of it paved in the 9th century, 25
Cordus, Valerius, account of him, 57
Cork, 108. Properties of it, *ibid.* Account of the cork-tree, 109. Was known to the Greeks and the Romans, 110. Cork used by the ancient fishermen as floats to their nets, 112. Anchor-buoys made of it, 113. Romans made soles of it, to secure their feet from water, 114. Cork-jackets, antiquity of them, 115. Ancient methods of closing up wine-casks and other vessels, 116. Wooden casks not common among the ancients, 117. Cork stoppers first introduced after the invention of glass bottles, *ibid.* Antiquity of the words *boutiaux* and *boutilles*, 118. Various substitutes for corks, 120
Collections of natural curiosities, why scarce in ancient times, 47
Cortex, signifies cork, 112
Crax alector, 357
Cream, nature of it, 373
Crocodile, when first known at Rome, 43
Curatores viarum, their office, 24
Cures, an account of them hung up in the temples of the ancients, 41
Curfeu-bell, what it was, 96
Cyanus of the ancients, copper-blue, 324
Cyprinus alburnus produces pearl-essence, 16
Cyprus, island of, produced good copper, 338

D.

DEPUTATI, persons appointed to carry wounded soldiers from the field of battle, 266
Dispensatorium, the first, 144
Dogs in Kamtschatka have socks on their feet to preserve them among the snow, 274
Drebbel discovered, by an accident, that a solution of tin with cochineal produces a beautiful scarlet, 192
Duck-weed, *lemna*, 306
Durra of the Arabs, kind of *holcus*, 244

E.

ECARLATE, meaning of the word, 190
Elbe, wood-floating on it, the earliest, 302
Elizabeth, St. the inventress of Hungary water, 103
Embroidery, antiquity of it, 215

Eobanus Hessus, extract from his poem on the wire-drawing machine, 233
Ephippium, signified at first a covering for a horse, afterwards a saddle, 249
Erysimum of the ancients, what plant it was, 236
Essence d'orient, 13
Ethiopians, ancient, acquainted with butter, 379
Eunapius, when he lived, 48

F.

FILATIM, what it signified, 232
Fil d'Archal, origin of the name, 230
Filigrane-work, antiquity of it, 231
Fire-watchmen in ancient Rome, 71
Fish, transported in the East covered with wax, 53
Flamma, or Fiamma, when he lived, 95
Flatting-mill, description of it, 220
Floating of wood, 293. Different methods of floating it, *ibid.* What gave rise to this invention, 295. Wood floated by Solomon for building the temple at Jerusalem, *ibid.* Wood floated at Camarina in Sicily, 297. Wood transported on water by the Romans, 299. Prodigious trunk of a larch-tree mentioned by Pliny, *ibid.* Romans brought fire-wood from Africa, 300. Earliest account of floating wood in Germany, *ibid.* History of wood-floating in France, 303, 304. *Jus grutiæ*, research respecting it, 305—308
Floats for nets, of what made in Germany and Sweden, 113
Fumaria explained, 70
Fumariolum, 86
Fournier, Anthony, improved the art of wire-drawing, 226
Fowls, said to thrive near smoke, 77

G.

GALLINÆ Africanæ, meleagrides, 353
Gallopavo, first mention of, 357
George II, how his body was embalmed, 54
Germanicus, what method he employed to strengthen his ancles, 258
Girasol, meaning of that word, 14
Glimmer, the use of it, 161
Gobelin, improved the art of dyeing scarlet, 193
Gold threads used for ornamenting dresses, 216
Grand-Bouteiller, his perquisite, 117
Granum, the same as *coccus*, 165
Gruta, grutia, meaning of these words, 307

Guiney-cocks mentioned by Cavendish, 368
Von Gulich improved the scarlet-dye, 193

H.

HAGELSHEIMER, an artist in wire-drawing, 226
Hair, how represented on metal heads found at Herculaneum, 221
Hanno, his voyages, 42
Hautsch, inventor of metallic dust, 160
Heidenkorn, buck-wheat, origin of that name, 240
Held. *See* Hagelsheimer
Herculaneum had paved streets, 25
Herodotus, his account of a kind of millet as large as a tree, 245
Hippace, cheese made of mare's milk, 377
Hippocentaur brought alive to Egypt, 48. How preserved when it died, *ibid.*
Homer, some of his epithets supposed to allude to horse-shoes, 284
Honey used by the ancients for preserving natural curiosities, 49
Hoofs of horses, how hardened by the ancients, 281
Horse-shoes, 270. Writers on the antiquity of them, *ibid.* Methods employed by the ancients to preserve the feet of their cattle, 271. Mules shod with silver and gold, 273. Shoes of the Roman cattle ill fastened on, 274. Proofs of horses being shod among the ancients, 276. Hoofs of the ancient cavalry soon spoilt and worn out, *ibid.* Ancients were unacquainted with horse-shoes such as ours, 277. Employed on that account great care to procure horses with strong hoofs, 280. Horses not shod in Ethiopia, Japan, and Tartary, 281. Examination of the grounds on which some affirm that the horses of the ancients were shod in the same manner as ours, 283—286. Horse-shoe said to have been found in the grave of Childeric, 287. Mistake of Pancirollus respecting the antiquity of our horse-shoes, 288. Horse-shoes first mentioned in the 9th century, under the name of *selinaia*, 289; mentioned by Italian, English, and French writers of the same century, 291. The practice of shoeing horses when introduced into England, 292. Horse-shoes found in some of the graves of the old Germans and Vandals, 293
Hungary water, 102. Method of preparing it, *ibid.* Fabulous origin of the name, 103. Receipt for making it first mentioned in a small book by John Prevot, 104. Copy of the receipt, *ibid.* Name *aqua vitæ*, known in Hungary so early as the 14th century, 106. Real origin of the name *l'eau de la reine d'Hongrie*, 108

I. J.

JACKETS, cork, of the ancients, 115
Jacks driven by smoke, antiquity of them, 360
Japan, horses there have shoes made of straw, 282
Jaquin, inventor of glass pearls, 12
Jerusalem, streets of it swept every day, 23
Jesuits said to have brought turkeys to Europe, 366
Jews obliged to clean the streets at Hamburgh, 38
Ignitegium or *pyritegium*, 96
Indians near the Red Sea, their art of making shell-fish produce pearls, 3
Indigo, why the use of it was decried, 188
Ingrassias first discovered that bone in the ear called *stapes*, 259
Insects, the manner of their production little known to the ancients, 169
Intexere and *insuere* signified the same thing, 216
Inventions often later than what might have been expected, 256
Iron produces blue glass, 340
Julian would not suffer his apartment at Paris to be heated during the winter, 93
Jus grutiæ, origin of the term, 305
Justin, emperor of the West, his ignorance, 204. Means contrived to enable him to write, *ibid.*

K.

KENTMANN, his collection of natural curiosities, 59
Kermes and cochineal, 163. Belong to the same genus, 164. Three kinds, described, *ibid.* Second species of them mentioned by the ancient Hebrew, Greek, Latin, and Arabian authors, *ibid.* Places where the ancients collected kermes, 166. Kermes still found in the Levant, 167. French and Spanish kermes, 168. How collected by the ancients, 169, 170. Name given to them in the middle ages, 171. How preserved at those periods, 172. When this dye was known in Germany, 173. Origin of the name *kermes*, 175. Opinion of professor Tychsen, on the subject, 175—178. Discovery of the American cochineal, 182. Described by Acosta and Herrera, 184. Disputes whether cochineal was insects or berries, *ibid.* Bett on this subject, *ibid.*; how determined, 185. A plant with insects upon it sent to Linnæus by Rolander, *ibid.*; the insects destroyed by the ignorance of his gardener, *ibid.* Real cochineal brought to St.Domingo, by Thierry a French naturalist, 186.

Kermes early employed in the East to dye red, *ibid.* This conjecture seems to be confirmed by a passage in Vopiscus, 187. Derivation of the word *scarlet,* 189. Oldest writers who use the word *scarletum,* 191. Drebbel discovered that a solution of tin produced with cochineal a beautiful scarlet colour, 192. Gobelin improved the art of dyeing scarlet in France, 193. The first dye-house for scarlet in England established by a Fleming, 194
Kitchens of the ancients much exposed to smoke, 69
Kuffelar improved the dyeing of scarlet, 194

L.

LAC CONCRETUM, meaning of it uncertain, 386
Lace, 309. Method of making it, 310. Was not known to the ancients, 311. *Opus Phrygianum* explained, *ibid.* Lace among old church furniture, 312. Establishment of the lace-manufacture in France, under Colbert, *ibid.* Lace, a German invention, 313. The art of making it found out at Annaberg, in 1561, by Barbara Uttmann, *ibid.*
Lack, the Arabic for *red,* 190
Lanyer, inventor of velvet paper-hangings, 155
Lapis lazuli, where found, 315
Larch-fir, planks of it transported to Rome by water, from the Alps, 299
Lava, blue vitrified, used for mosaic work, 341
Lebanon, cedars of, described, 296
Legs, disease of, occasioned by riding without stirrups, 258
Leodius could not procure butter in Spain, 389
Leontius, when he lived, 327
Ligna cocta explained, 79
Linen interwoven or embroidered with gold threads, 217
Linnæus, his discovery of forcing shell-fish to produce pearls, 6. Why ennobled, 7. His arms, *ibid.*
Lomentum, meaning of it, 337
London, when paved, 28, 29
Londrindiana, invention of, 156
Lotharingia, duke of, imperial fire-master, 100

M.

MAIZE, brought from America, 370
Margaritini explained, 11
Marquis, French, his stratagem to gain the affections of his mistress, 18
Medicamentarii, their employment, 124
Meleagrides of the ancients, our Guinea-fowls, 351
Mexicans, said to have been acquainted with the use of cochineal before the discovery of America, 182

Milium Indicum of Pliny, what it was, 244
Milk, its component parts, 379
Minerals of the ancients, difficult to be ascertained what they were, 335
Moorish millet, origin of the name, 246. When made known, 244
Mud, fished up by the ancients in nets, 298
Mules used formerly for riding, instead of horses, 273
Murano, artificial pearls made there, 14
Muscles, what kind of them contain pearls, 5

N.

NATURAL curiosities, collections of them, 41. Rare natural productions deposited by the ancients in their temples, 42. An account of different articles of this kind, and where kept, 42—45. Collection of natural curiosities formed by Augustus, 45. Apuleius fond of natural history, 46; collected petrifactions on the African mountains, *ibid.* Natural bodies preserved in ancient times by means of salt, 47. Heads of the martyrs preserved with salt, 48. Different animals preserved in the same manner, 49. Dead bodies preserved from putrefaction by being put in honey, *ibid.*; instances of this practice, 50. Dead bodies among the Scythians, Assyrians, and Persians, covered over with wax, 52. Fish and apples transported in wax, 53. Origin of the ancient custom of wrapping up dead bodies in wax-cloth, *ibid.* Instances of it, 54. Books found in the grave of Numa, how preserved, 55. No traces of collections of curiosities in the middle ages, but in the treasuries of kings and princes, *ibid.* Where collections were first formed by private persons, 57. The first private collections in the 16th century, *ibid.* The oldest catalogues of such collections, 59, 62
Nopal, cochineal plant, 183
Norway, present of butter there, as large as a man could carry, 391
Numa, his books when found, 55
Nuremberg, art of wire-drawing brought to great perfection there, 225
Nyssa, root of it used for corks, 120

O.

OAK, the cork-tree a species of it, 109
Ocimum of the ancients not buck-wheat, 235
Oil, how preserved by the ancients, 78
Opuntia, account of that plant, 183
Opus Phrygianum, explained, 311
Oviedo described two kinds of tuna, 183
Oxygala, meaning of it, 385

P.

PAINTING, how divided, 155

Paper, Chinese silver-coloured, 162

Paper-hangings, 152. Different kinds of them, *ibid.* Printed much in the same manner as cotton, 153. Velvet-paper, how prepared, 154. Invented in England by Jerome Lanyer, 155. Called at first Londrindiana, 156. Tierce, a Frenchman, disputed this invention with the English, 157. Audran, his invention, 158. The art of imprinting gold and silver figures on paper invented by Eccard, *ibid.* Oldest account of such hangings made in Germany, *ibid.* New improvement in them, 159. Metallic dust invented by an artist at Nuremberg, 160. Silver-coloured glimmer employed in making paper-hangings, 161

Paris, how wood was conveyed to it in floats, 303. When its streets were paved, 26. Why called *Lutetia*, *ibid.* Cleaning of the streets there, 31

Parisians compelled to construct privies, 36, 37

Paving of streets, 19. More accounts of paved high-ways than of paved streets to be met in the works of the Greeks and the Romans, 20. Streets first paved by the Carthaginians, 21. Streets of Thebes were paved, 22. Whether the streets of Jerusalem were paved, not known, *ibid.* Time when the streets of Rome began to be paved, cannot be determined with certainty, 23. Information on this subject by Livy, *ibid.* Pavement of Herculaneum and Pompeii, 25. Cordova, in Spain, paved in the 9th century, *ibid.* Paris not paved in the 12th century, 26. Cause of its being paved, *ibid.* Why its name *Lutetia* was changed to that of Paris, *ibid.* Streets of London not paved in the 11th century, 28. Time when Smithfield-market was paved, 30. German cities, when paved, *ibid.* Citizens of Paris obliged in 1285 to repair and clean the streets, 31. Regulations on this subject, 32, 34. Reason why an order was passed that no swine should be suffered to run about the streets, 34. In the 14th century people at Paris permitted to throw any thing from their windows, 35. A like practice in Edinburgh, *ibid.* Privies erected in France by an order from government, 36. Police-regulations respecting streets in the cities of Germany, 38. Privies erected at an earlier period in Germany than in Paris, 39

Pavo bicalcaratus, the peacock-pheasant, 354

Pearls, artificial, 1. Real pearls calcareous, and soluble in vinegar, *ibid.* The art of forcing shell-fish to produce pearls known in the first centuries of the Christian æra, 3. Method by which the Chinese cause muscles to produce pearls, 4.

Invention of Linnæus for the same purpose, 6. How pearl-fishers know those shells which contain pearls, 9. Conjecture respecting the secret of Linnæus, 10. Different kinds of artificial pearls, 11, 12. Invention of Jaquin for preparing artificial pearls, 13. His manner of making pearls described, 14, 15. Account of the fish from the scales of which he made his pearl-essence, 16; where they are caught, *ibid.* Time of this invention uncertain, 18
Pelethronius invented a covering for the backs of horses, 247
Persia, writing-reeds produced there, 199
Pest-houses or lazarettos, when erected, 150
Peter de Clugny, some account of him, 207
Petrifactions collected by Apuleius, 46
Pharmacopolæ sold medicines, 124
Phrygians embroidered with the needle, 312
Phrygianum opus, 311
Phrygioniæ vestes, ibid.
Physemata were a kind of pearls, 14
Physicians, ancient, prepared their own medicines, 122
Pigmentarii, their employment, 123
Pigna, account of him, 330
Pintadoes or Guinea-fowls, 351
Plague, origin of it, 146
Poliphilus, a name assumed by Fr. Columna, 264
Porcelain of the Chinese, from what it receives its blue colour, 339
Post-horses, relugation of the emperor Theodosius respecting their saddles, 251
Postilena, meaning of that word, 253
Prayer-bell, origin of it, 97
Prevot first gave a receipt for preparing Hungary-water, 104
Privies, when first erected at Paris, 36; earlier in Germany than in France, 39
Purple liquor or dye, how preserved by the ancients, 51.

Q.

QUARANTINE, 145. Origin of this beneficial regulation obscure, *ibid.* Plague, whence brought to Europe, 146. Quarantine said to have been first established by the Venetians, 147. Account given of it by Le Bret, 148; seems to make it a century earlier than it ought to be, 149. Institution of the council of health, mentioned by Bembo, *ibid.* Account given by Cantarenus and in the newest Topography of Venice, 150. When letters of health were first written, 151
Quercus, derivation of it from the Celtic, 175
Quercus ilicis, frequented by kermes, 164
Quercus suber of the Romans our cork-tree, 111

Quickelberg, some account of him, 59

Quills for writing, antiquity of them, 204. Scarcity of them at Venice in the 15th century, 211

Quisquilium, cusculium, scolecium, the word scarlet derived from them, 189

R.

REEDS, the kinds used by the ancients for writing not properly known, 196. Places where the best grew, *ibid.*

Regalia belonged at first to private persons, 305

Reuchlin, his misfortunes, 210

Riding without saddles or any covering for the horse, usual among the ancients, 247

Riding-servants kept to assist people to get on horseback, 262

Rolander sent the cochineal plant with live insects on it to Linnæus at Upsal, 185

Romans, how their young men were accustomed to vault on horseback, 260

Rome, when paved, 23

Rudolf, inventor of the drawing-machine for making wire, 224

Ruscellai, Jerome, the same as Alexius Pedemontanus, 330

De Ruuscher, his bett respecting the nature of cochineal, 184

S.

SADDLES, 247. In early ages people rode on the bare back of the horse, *ibid.* When coverings were introduced, *ibid.* Old Germans despised the Roman cavalry, who employed them, 248. Opinion of Pancirollus respecting the invention of saddles, 250. Order of the emperor Theodosius in the year 385 a proof of the antiquity of saddles, 251. Prohibition of the emperor Leo I, that no one should ornament saddles with pearls or precious stones, 253. Conjecture of Goropius Becanus, that the saddle was invented by the Salii, 254. Saddles invented by the Persians, *ibid.*

Saggina, of the Italians, 246

Sandix, a dye-plant of the ancients, 188

Sapphire of the ancients our lazur, 322

Scala, a stirrup, 265

Scandilia, stirrups, 269

Scansuæ, the same, 266

Scarlata, scarlet, origin of the word, 190

Schneeberg, the oldest colour-manufactories there, 345

Scolecion of Pliny explained, 169

Scythians acquainted with butter, 377

Selenaia, horse-shoes, first mentioned in the works of the emperor Leo, 289

Sella, 252
Sellare, insellare, to saddle, 254
Selliers, origin of the name, *ibid.*
Semiramis caused highways to be paved, 21
Seplasiarii sold medicines, 123
Ships at first were a kind of rafts, 295
Silver, when people began to draw it into threads, 217
Slag, blue, used for mosaic work, 341
Smalt, when ground, called powder-blue, 333. Invention of it, 343
Smör, the Swedish for *butter*, 387
Soles of cork, used at Rome, 114
Solomon caused timber to be floated, 295
Soot of butter, a medicine used by the ancients, how prepared, 381
Spangles, how made, and when invented, 231
Spartum of the ancients, what plant it was, 271
Spondias lutea serves for corks, 120
Staffa, a stirrup, 259, 269
Stapeda, stapedium, the same, 259
Stapes, a bone in the ear so called, and by whom discovered, *ibid.*
Stationarii, their employment, 128
Stirrups, 255. Authors who treat on the antiquity of them, *ibid.* No traces of any invention for supporting the legs while riding to be found in the works of the ancients, 257. Hippocrates and Galen speak of a disease occasioned by long riding, because the legs hung down, 258. No term for stirrups in the Greek and Latin languages, 259. Opinion of Montfaucon respecting the antiquity of stirrups, 260. Stones, to assist people to mount on horseback, erected in ancient times, 261. Persons of rank kept riding-servants to assist them to get on horseback, 262. Barbarous practice of making vanquished generals stoop, that the victor might mount his horse by stepping on their backs, *ibid.* Sapor, king of Persia, treated the emperor Valerian in this manner, *ibid.* Warriors had a projection on their spears for resting the foot on while they were getting on horseback, 263. Error of Galeotus Martius respecting stirrups, *ibid.* False opinion of Magius and others, 264. First certain account of stirrups to be found in a book written by the emperor Mauritius on the art of war, 265. Isidore in the 7th century speaks of stirrups, 266. Stirrups appear at the saddles of horses in a piece of tapestry of the 11th century, 269. Pride of the clergy in causing emperors and kings to hold their stirrups when they mounted on horseback, *ibid.*
Stones, precious, of the ancients, not well defined, 319
Stools once used for mounting on horseback, 262

Stoves of the ancients, 82, 89
Strata, coverings for horses, 247
Stratores, riding-servants, 262
Streets, when first paved, 21
Suber, our cork, 111
Subsellares, were not stirrups, 269
Suppedaneum, what it meant, 262
Swine belonging to the monastery of St. Anthony at Paris, 34. Anecdote respecting them, *ibid.*

T.

TALK employed for giving a silvery appearance to paper-hangings, 161
Tapestry, beautiful red colour in some of the 11th century, 192
Teeth fixed by the ancients by tying a piece of gold wire around them, 222
Teething, pain of, how eased, according to Pliny, 388
Temples of the ancients repositories for preserving natural curiosities, 42
Thebes had paved streets, 22
Theodoric, king of the Ostrogoths, so ignorant that he could not write, 203. Expedient to remedy this deficiency, *ibid.*
Thierry carried the real cochineal plant to St. Domingo, 186
Tin, solution of, who first employed it for dyeing scarlet, 192
Tobacco, when brought to Europe, 370
Toll-hout, kind of wood used by the Dutch and Hanoverians for making floats to their nets, 113
Tournefort, his account of the reeds used in the East for writing, 198
Tragulæ, floats to nets so called by the ancients, 113
Trains de bois explained, 304
Transmarinum and *Ultramarinum*, meaning of these words, 319
Travelling apothecaries-shop at the Byzantine court 143
Tribuni rerum nitentium had the care of cleaning the streets at Rome, 31
Trimalchio, his *amphoræ vitreæ*, 117
Tuna, cochineal plant, 183
Turkeys, 350. Are not the *meleagrides* and *gallinæ Africanæ* of the ancients, 351. Were not known in Europe before the discovery of America, 355. Error of Mr. Barrington, who asserts the contrary, *ibid.* Were first mentioned by Oviedo, 356. Called by Lopez de Gomara *gallopavones*, 357. Wild turkeys still found in America, 358. Earliest account of turkeys in Italy, 360. When first introduced into England, 361. When brought to France, 362. When known in

Germany and other northern countries, 366. Enquiry into the time when they were carried to Asia and Africa, 367—369. Observations on the assertion of Mr. Barrington, that they came originally from Africa, *ibid.* Why called turkey-fowls, 372
Turks, when they became known, 265

V.

VALERIAN, in what manner treated by Sapor king of Persia, 262
Vermeil, vermillon, origin of these words, 171
Vermiculata, cloth dyed with kermes so called in the middle ages, *ibid.*
Vestes Phrygioniæ explained, 311

U.

ULTRAMARINE, 315. How prepared from lapis lazuli, *ibid.* Lapis lazuli, where found, *ibid.* Price of ultramarine, 318. Lapis lazuli is the sapphire of the ancients, 319. Apartments of the palace of Zarskoe-Seloe lined with it, 323. Origin of the name, 325. Oldest mention of it to be found in Leontius, 327. The word *ultramarine* first used by Camillus Leonardus, 329. Pigna, an apothecary at Modena, acquired a fortune by preparing this colour, 330. Preparation of ultramarine said to have been found out in England, 332
Uttmann, Barbara, invented the art of making lace, 313

W.

WARSAW, privies began to be erected there only a few years ago, 36
Wax, by whom used for preserving dead bodies, 52
Wax-cloth employed for the same purpose, 53
Wassenaer, family of, their right over rivers, 305
Weaving practised in monasteries, 179
Windows of the ancients had no glass, 337
Wine, spirit of, who first attempted to preserve animals in it, 59
Wire-drawing, 212. Oldest method of preparing metal wire, *ibid.* Earliest use of gold threads for ornamenting dresses, 213. Cloth of Attalus was embroidered with the needle, 215. Threads of silver interwoven in cloth at a later period than threads of gold, 217. Wire-drawing, as practised at present, not known in Italy in the time of Charlemagne, 218. Invention of the drawing-iron belongs to the 14th century, 219. Wire, how flatted, 221. Remains of ancient wire-work, 222. Large drawing-machine, driven by water, supposed to be invented at Nuremberg by one Rudolf, 224. Art of wire-drawing brought to great perfection at

Nuremberg, 225. History of it there, 226—228. The flatting of wire introduced at Augsburg by George Geyer, 229. Art of wire-making, when known in England, 230. Iron wire in France, *ibid.* Filigrane work, the antiquity of it, 231. Spangles, how prepared, and when invented, 233.
Wire, iron, bits of it incrusted with a pearly substance, and found in *chamæ* brought from China, 5
Wood used by the ancients for fuel, 81. Was sold by weight, 80. How the ancients rendered it less liable to smoke, 79
Writing-pens, 193. Instruments used by the ancients for writing, *ibid.* Reeds which they employed for that purpose, not known, 196. Places where they grew, *ibid.* Reeds used still in Persia for writing, 197. Tournefort's account of them, 198. Passages in the ancients which seem to allude to writing-quills, 201, 202. Use of quills said to be as old as the 5th century, 203. The oldest certain account of writing-quills to be found in a passage of Isidore, 204. Mentioned in the 8th century, by Alcuin, 205. Proofs of their being used in the 9th, 11th, and 12th centuries, 206. Assertion of the Dutch poet Heerkens, that the Romans became acquainted with the use of writing-quills during their residence in the Netherlands, 207. Reeds continued long in use even after quills began to be employed, 209. Writing-quills so scarce at Venice in 1433, that it was with great difficulty men of letters could procure them, 211

Z.

ZAFFERA, oldest mention of that word, 348
Zarskkoe-Seloe, apartments there lined with amber and lapis lazuli, 333
Zealand, New, privies there at a time when there were none at Madrid, 36

END OF THE SECOND VOLUME.

Printed by S. Hamilton, Weybridge, Surrey.

THE NEW YORK PUBLIC LIBRARY
REFERENCE DEPARTMENT

This book is under no circumstances to be taken from the Building

form 410